

MACHINE-TOOL SHORTAGES

REPORT OF THE SELECT COMMITTEE ON SMALL BUSINESS UNITED STATES SENATE

THE IMPACT OF MACHINE-TOOL SHORTAGES ON SMALL MANUFACTURERS



JUNE 30 (legislative day, JUNE 27), 1952.—Ordered to be printed
with illustrations

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1952

SELECT COMMITTEE ON SMALL BUSINESS

(Created pursuant to S. Res. 53, 81st Cong.)

JOHN SPARKMAN, Alabama, *Chairman*

RUSSELL B. LONG, Louisiana

GUY M. GILLETTE, Iowa

HUBERT H. HUMPHREY, Minnesota

LESTER C. HUNT, Wyoming

WILLIAM BENTON, Connecticut

BLAIR MOODY, Michigan

CHARLES W. TOBEY, New Hampshire

LEVERETT SALTONSTALL, Massachusetts

EDWARD J. THYE, Minnesota

ROBERT C. HENDRICKSON, New Jersey

ANDREW F. SCHOEPEL, Kansas

JAMES H. DUFF, Pennsylvania

LAURENCE G. HENDERSON, *Staff Director*

WALTER B. STULTS, *Assistant Staff Director*

CHARLES M. NOONE, *Counsel*

MINNA L. RUPPERT, *Clerk*

SUBCOMMITTEE ON MOBILIZATION AND PROCUREMENT

BLAIR MOODY, Michigan, *Chairman*

RUSSELL B. LONG, Louisiana

GUY M. GILLETTE, Iowa

LEVERETT SALTONSTALL, Massachusetts

JAMES H. DUFF, Pennsylvania

WILLIAM D. AMIS, *Investigator*

CONTENTS

	Page
Introduction.....	1
Part I—	
Hearings on machine-tool shortages.....	4
Testimony of small manufacturers.....	4
Des Moines University of Lawsonomy.....	7
Machine-tool recovery program.....	12
Government measures to meet the demand for machine tools.....	13
Effect of machine-tool shortages on military programs.....	22
Heavy-press program.....	29
Testimony of major prime contractors.....	31
Testimony of machine-tool builders.....	34
Part II—Conclusions and recommendations.....	41
Appendix. 1951 machine-tool exports.....	45

MACHINE-TOOL SHORTAGES

JUNE 30 (legislative day, JUNE 27), 1952.—Ordered to be printed
with illustrations

Mr. MOODY, from the Select Committee on Small Business, submitted
the following

REPORT

INTRODUCTION

Since the Korean outbreak in June 1950, the Select Committee on Small Business has conducted numerous studies and surveys relating to a wide range of problems confronting small business. These undertakings were prompted by complaints coming to your committee from small-business men who, for the second time within a decade, had to abandon their normal business affairs and adjust to a mobilization economy. Material shortages, priorities, and many other incidents of Korea received close attention. In each instance, the matters selected by the committee for intensive and long-range study were those which appeared to have the greatest impact on small business. Problems which appeared to be common to a large segment of the small business community and which seemed to threaten the greatest danger to small concerns were generally given priority in the committee's program.

One such problem on which the committee deferred action was that relating to machine-tool shortages. Shortly after Korea the committee began to receive complaints from small manufacturing concerns who, partly at the suggestion of the committee, were attempting to obtain defense contracts. Knowing that production of civilian goods would be curtailed during the ensuing build-up of the Nation's defense potential, the Select Committee on Small Business had encouraged America's small manufacturing concerns, some 300,000 in number, to get into defense production and had urged the Department of Defense to channel more of its contracts into small concerns.

Small manufacturers advised your committee that because of machine tool shortages they were experiencing difficulty in obtaining defense contracts. They stated that in many instances the items required by the military called for machine tools of greatly advanced design. Unless the manufacturer had the necessary machine tools,

he was unable to bid on defense contracts. And when he attempted to purchase a needed machine tool from a builder in order to qualify as a bidder on a contract, he was stymied. He learned that the system of priorities on machine tool distribution required that he hold a defense contract before he could qualify to receive a machine tool. Even if he could surmount this formidable obstacle, the small manufacturer would in most instances have to wait many months for delivery on the machine tool.

The committee was aware of the fact that great advances had been made in military science and engineering technology since the close of World War II. It recalled the words of Thomas K. Finletter, Secretary of the Air Force, who said in February 1952:

It is not fully realized that the revolution in military art, which began in the closing days of World War II and is now at its height, is the greatest revolution in military techniques in history. By this I mean that the destructive power of a military force has increased since 1945 (and is still increasing) at a faster rate than at any previous time in world history; and that the military and political consequences of this revolution will transcend by far any previous advance in the military art.¹

The committee knew that the jet age and the development of atomic warfare had created a demand for an entirely new family of machine tools. Obviously, owing to the very nature of the machine-tool industry, where extreme precision and painstaking care necessitated long lead times in the building of these new tools, the wide demand for its products could not be satisfied overnight. Bearing in mind also that the industry had been at a low ebb just before Korea, your committee recognized the fact that the industry faced an uphill battle to recruit skilled manpower, acquire necessary facilities and materials, and to overcome a myriad of other bottlenecks if it were to multiply its production.

Recognizing these problems, your committee was not alarmed at the outset by the reports of shortages of the new type, special-purpose machine tools. It believed that the industry would duplicate its World War II feat when, within 3 years, it increased its output more than 10 times the prewar average. Such a performance in the new emergency would certainly dissipate many of the problems of the small manufacturers seeking the assistance of the Select Committee on Small Business.

Another aspect of the matter did give the committee cause for concern, however. It learned that small manufacturers were having difficulty not only in acquiring the new type machine tools but also in attempting to purchase general purpose machine tools such as lathes and grinders. The small manufacturers stated that in order to bid on a particular defense contract or to complete one already awarded to them, they needed either additional general purpose machine tools or new tools to replace their own outmoded and outworn equipment.

The committee recognized the fact that the same factors causing the shortages of new type and special purpose machine tools accounted in part for the shortages of general purpose tools. When, however, in late 1951, 18 months after Korea, complaints of this nature continued to come to the committee, it was apparent that a full scale survey of the machine tool program was required. A preliminary

¹ Remarks at annual banquet of New York Patent Law Association, New York City, February 26, 1952.

study was therefore undertaken to discover the areas of greatest difficulty.

The study indicated that problems arising from machine tool shortages were not confined to small manufacturers. Some of the country's largest manufacturing concerns, producers of the most vital defense items such as jet engines, were also troubled by machine tool shortages. Knowing of the inability of many small manufacturing concerns to undertake prime military contracts, your committee had repeatedly advocated an increase in subcontracting by large concerns. The delay on the part of large manufacturers in extending their subcontracting operations had been somewhat of a disappointment to the committee. The preliminary survey of machine tool shortages served in large part to explain this delay. Large manufacturers, themselves delayed in getting into full production because of machine tool shortages, were in no position to require large scale subcontracting by smaller concerns.

The study indicated also that the shortages were most acute in the heavier metal-cutting and metal-forming machine tools. The term "machine tool" is often used to describe all sizes and types of tools ranging from the heaviest forging presses down to jigsaws and even small precision measuring tools and attachments. Technically but broadly speaking, machine tools are of two kinds. Both are power-driven machines, not portable by hand. The one shapes metal by cutting it to shape and size through a chipping operation. Among the machine tools in this group are lathes, shapers and slotters, drilling and boring machines, planers and screw machines. The second kind of machine tool shapes metal by shearing it or by hammering or squeezing it into shape. Among the machine tools in this category are hydraulic presses, drop hammers, forging machines, press brakes, and punch presses. Production of metal-cutting machine tools is normally about four times greater than that of metalworking equipment. In all there are over 300 types of machine tools. Some are smaller than a desk. Others range in size to hundreds of tons. The price of a machine tool may range from \$500 to over \$100,000. It was these types of machine tools, particularly the metal-cutting equipment, that the study indicated to be in short supply. It was due to the shortages of these vital keys to defense production that manufacturers, small and large alike, were handicapped in their efforts to get on with the job of arming our defenses.

The preliminary study high-lighted another fact which was of direct interest to the Select Committee on Small Business. In many quarters the blame for the delay in the production of machine tools was laid to the machine-tool industry. There were reports that the industry was not measuring up to its responsibilities, that it was reluctant to subcontract or to expand its own facilities in order to meet the tremendously increased demand for its products. On the other hand, spokesmen for the industry stated that the machine-tool builders had been faced with serious problems in manpower, materials, and price ceilings and had met with considerable difficulty and delay after Korea in getting the responsible officials in Washington to recognize those problems and to give the industry the aid it needed in order to do its job. Industry spokesmen pointed out that historically, machine tools are a "feast and famine" business and that the violent depression which hit the industry after World War II left it incapable of

meeting the new emergency without substantial and expeditious assistance from Washington. Unfortunately, the necessary assistance was not forthcoming with sufficient vigor and scope until more than a year after Korea.

These facts were of significance to your committee because it realized that the machine-tool industry, comprising only about 300 companies, played a part in American industrial production far out of proportion to its size. The average company in the industry represents an investment of about \$800,000 and normally employs from 200 to 250 men. Even today total employment in the industry does not exceed 75,000. In normal times the industry's sales total approximately \$300 million per year, an amount about equal to the monthly sales of one large automobile manufacturer.

The preliminary study indicated a definite need for a thorough-going inquiry into machine-tool shortages. The impact of machine-tool shortages on small manufacturing concerns was apparent. It was also apparent that the machine-tool industry, comprised mostly of small concerns, had unique problems which warranted study by the committee.

PART I—HEARINGS ON MACHINE TOOL SHORTAGES

The task of surveying machine tool shortages was assigned to the Subcommittee on Mobilization and Procurement of the Select Committee on Small Business. Hearings were conducted over a 6-week period during February, March, and April 1952. The hearings were launched not with a view to criticizing any individual or agency or firm but with a sincere desire to search out the facts of the situation. The committee was aware of the fact there had been delays in increasing the production of machine tools, that mistakes had been made at many points in the months immediately following Korea, and that steps had already been taken to rectify those mistakes. The committee was therefore not interested in what had gone before except so far as it affected the present. The committee's primary interest was in determining whether, nearly 2 years after Korea, all proper steps had been taken to expedite the production of machine tools. The chairman of the subcommittee stressed this approach with the following words at the opening of the hearings:

We intend during the course of these hearings to take a close look at the overall machine tool problem. We shall be particularly interested in the efforts made by both government and industry to break the machine-tool bottleneck. We recognize that there are many problems peculiar to the industry, but we want to assure ourselves that all facets of the problem are receiving necessary attention.

TESTIMONY OF SMALL MANUFACTURERS

Small manufacturers, representing all sections of the country, testified before the subcommittee. Their complaints paralleled those of the many other small manufacturers who had been coming to your committee since Korea, seeking assistance in their efforts to obtain machine tools. Their testimony served as a back drop to the testimony of later witnesses representing other segments of the economy involved in the machine tool program.

Porter Landrum, Jr., sales manager of the Southern Products Co., of Birmingham, Ala., stated that his father founded the first machine shop in Alabama in 1919 and that their company was currently engaged

100 percent in the manufacture of precision machine parts on various defense contracts. The company held several prime defense contracts including 14 with the Ordnance Tank-Automotive Center at Detroit and others with a number of arsenals. In addition the company was doing subcontract work on such items as the M-1 rifle and tanks being produced by Chrysler.

Mr. Landrum stated that his company employed 22 people on two shifts. They were having difficulty in maintaining the quality of their precision work due to the fact that their machine tools were wearing out. The company was in need of a new surface grinder and an improved thread grinder. All of the company's contracts carried priorities for materials but no priorities for equipment. When the company attempted to place an order for a surface grinder the manufacturer advised that he would require a directive and that delivery of the machine tool could not be assured in less than 15 months.

Similar difficulties were encountered when Mr. Landrum attempted to place an order for a thread grinder. He discovered during the course of his search that a local university had a new one which was not being used. The university had acquired the thread grinder at a greatly reduced price from the Government following the close of World War II. Although the tool was not being used by the school, Mr. Landrum learned that the authorities at the school did not want to lease it and that the Government would not allow them to sell it.

William Canterbury stated that he was the sole owner of the S. C. & L. Machine Co., of Rockford, Ill., and that the company was organized in 1946. Its sole civilian product was a patented die-marking tool. The bulk of its business from 1946 through 1949 was in assembly work for a large clock manufacturer. During that period the company employed 50 people. Following Korea the company tried to get defense work in order to keep going but was blocked in these attempts largely because they did not have any automatic screw machines. They could not buy new screw machines without directives and available used screw machines, according to Mr. Canterbury, were prohibitively high in cost and would not hold the close tolerances required on the contracts in which his company was interested. As a result of his inability to get proper machine tools Mr. Canterbury's company was employing only 5 people, and 38 machines were idle in his plant.

Kenneth H. Bradshaw, vice president and general manager of the O-T-M Supply Co. of Houston, Tex., testified that his company was engaged in the manufacture of industrial piping supplies. He stated that the company was currently furnishing 50 percent of the piping supplies to the contractor building the Savannah River plant of the Atomic Energy Commission and that the company was similarly associated in the construction of a number of other vital defense installations. O-T-M Supply Co. employed 144 people and had 36 production machines in its plant. Company representatives had been trying since August 1950 to obtain nine machine tools and as of February 1952 had received only one. Mr. Bradshaw stated that on one particular machine tool, a turret lathe, his company had placed an order with the builder in September 1950. It was originally promised for delivery in May 1951. Despite the fact that O-T-M had a rated order for the lathe, the manufacturer postponed the delivery date five different times. The most recent promise was for delivery to O-T-M in June 1952.

Mr. Bradshaw described his company's efforts to get needed machine tools through used machine tool dealers and schools. He said that the price of used machine tools was exorbitant when one considered the age and condition of the tool and compared it with a new one. A lathe that sold originally around 1938 for about \$9,000 would command a price today of from \$12,000 to \$14,000. A new, improved model of the same lathe sells for from \$20,000 to \$24,000. Mr. Bradshaw pointed out, however, that the advanced design and automatic attachments on the new machine would justify the increased cost. The used machine tool, on the other hand, would be costly to operate due to frequent breakdowns and its low rate of production.

O-T-M representatives visited numerous schools in their attempts to locate machine tools. According to Mr. Bradshaw they saw urgently needed machine tools lying idle. Boring mills, turret lathes, and other heavy production equipment were found in educational institutions. These were units that did not lend themselves to educational purposes, but owing to the conditions under which the schools acquired them after World War II, they could not be disposed of by the schools.

Edward D. Wilcox, president of the Wilcox Machine Co., of Sarasota, Fla., stated that he had been engaged in industrial engineering for 30 years and that he had operated a plant in Connecticut during World War II where he manufactured small-arms ammunition tools. Following World War II he retired to Florida and then in May 1951 organized his present company to resume production of small tools. He stated that the Wilcox Machine Co., employed 35 people and was the only complete production shop on the west coast of Florida. Speaking of his difficulties in obtaining machine tools, Mr. Wilcox said that after having been in retirement for 4 years and out of touch with manufacturing, he was alarmed to discover how much the prices of machine tools had advanced since the close of World War II. He stated that an automatic-screw machine which he had purchased in 1945 for around \$10,000 now costs \$20,500 for the bare machine. Attachments and fixtures would increase the cost of the complete machine to \$27,000 delivered in Mr. Wilcox's plant. An ordinary bench lathe which he could buy during World War II for about \$160 now costs in the neighborhood of \$750.

When he placed his orders with the machine-tool builders, Mr. Wilcox had the same experience as the previous witnesses. There were indefinite promises and long delays on deliveries. Mr. Wilcox then investigated the used machine tool market. Again he was dismayed by the high prices. He was anxious to get five particular machines: a surface grinder, a milling machine, a cut-off saw, a honing machine, and a cylindrical grinder. He found that a machinery dealer in Brooklyn had them in stock. The dealer was willing to rent the machines but did not want to sell them. In order to get the machines Mr. Wilcox had to deposit \$4,000 to insure the safe return of the machines and then had to sign a 1-year rental contract for the machines at \$800 a month.

Like the previous witnesses, Mr. Wilcox had also explored the local schools in an effort to locate machine tools. He stated that the local high school had a lathe and a grinder which they had acquired from the War Assets Administration at the close of World War II. According to Mr. Wilcox, the lathe was sitting in a shed behind the school and had never been uncrated. The grinder had been uncrated and

moved into the school but had never been hooked up because the manual training instructor was afraid that someone might be injured if he tried to operate the machine. Mr. Wilcox stated that all efforts on his part to buy or lease the machines from the school had been turned down. He stated that he had offered to subcontract some of his work to the school but that this offer had also been rejected.

Mr. Wilcox testified that the machine tool shortages had a very real effect on his company. As a result of his difficulties in acquiring proper equipment he was delayed in completing subcontracts for such vital defense contractors as the Remington Arms Corp. and the Lockheed Aircraft Corp.

DES MOINES UNIVERSITY OF LAWSONOMY

The testimony of the small manufacturers regarding their efforts to buy or lease idle machine tools found in various educational institutions and their inability to do so prompted your committee to check closely into this aspect of the machine tool problem. The whole question of the disposition of World War II surplus machine tools and the possibility of reclaiming those tools for vital defense programs impressed the committee as being a field of inquiry of particular interest to small manufacturing concerns.

The committee's inquiry into the acquisition of surplus machine tools by educational institutions after World War II was high-lighted by information relayed to the committee by Clark Mollenhoff, Washington correspondent of the Des Moines Register and Tribune, with relation to the Des Moines University of Lawsonomy. Reports reaching the committee alleged that the University of Lawsonomy had acquired 62 machine tools from the War Assets Administration in 1947 for \$4,480.09 and had sold 45 of the units for an amount exceeding \$120,000. The 62 machine tools had cost the Government \$204,417.31. The school had reportedly acquired the machines on its promise that they would be used for educational purposes and would not be resold for at least 3 years. There were allegations that the University of Lawsonomy had acquired the machine tools merely for the profit to be gained on resale and that the school was not in fact a bona fide educational institution. Newspaper articles reported that the school had been denied tax exemption by State and local authorities in Iowa although the Bureau of Internal Revenue exempted the school from Federal taxes as an educational institution.

Alfred William Lawson testified before the committee that he was the founder and donor of the Des Moines University of Lawsonomy. He said that he purchased the buildings and grounds of a defunct Baptist university for \$80,000 in 1942 and turned the property over to a board of trustees to operate a university for the teaching of lawsonomy. In the words of Mr. Lawson, "Lawsonomy is the knowledge of life and everything pertaining thereto." He stated that he had written 50 books over the past 20 years on various lawsonomy principles and that students at the University of Lawsonomy concentrated their attention on these books. Students at the university pay no fees. Tuition is free, food and living quarters are furnished without charge, and clothing and laundry service are also furnished by the university. According to Mr. Lawson, the university subsists on contributions sent in by supporters all over the country.

When questioned regarding the purchase and resale of machine tools by the university, Mr. Lawson disclaimed all knowledge of such details, stating—

I never go into figures at all. I am thinking of great philosophical thoughts for the benefit of mankind that will come after me. I don't go into those little details of dollars and cents at all.

Mr. Lawson said that he was merely the donor of the university and that such matters were the responsibility of the trustees. He excused his inability to name the members of the board of trustees by stating that he was "a man 82 years of age with his memory on the decline."

The committee sought to determine whether, in accordance with the terms of contracts under which schools acquired surplus machine tools, the University of Lawsonomy had actually put the equipment to educational use. The following exchange took place:

Senator MOODY. What courses does the university teach on which these tools might be used?

Mr. LAWSON. Well, they teach lawsonomy, teach music, they teach theology * * *

Senator MOODY. On which of these courses would they use machine tools?

Mr. LAWSON. They were bought so that they could teach them the different names on the machines and how they were operated. This is what I understood was to be done.

Senator MOODY. In which course did you use the tools? You did not use them in the music course; did you?

Mr. LAWSON. Well, they were to use them in the mechanical end.

Senator MOODY. Do they teach mechanics at the university?

Mr. LAWSON. They teach the biggest and greatest mechanics the world has ever known; they teach lawsonomy principles. Lawsonomy is the knowledge of life and everything pertaining thereto, and that takes in mechanics. * * *

Senator MOODY. Have you ever seen these machines in operation?

Mr. LAWSON. I won't say that. They have done some machine work there. I have been there when they were sawing up one thing or another. * * * I don't think they were learning how to operate them. I think they were learning the reasons and the uses to be made of them. * * *

Senator MOODY. Did you ever attend such a class when those machines were being used for instructional purposes?

Mr. LAWSON. No; I can't say that I did.

When questioned as to the tax status of the University of Lawsonomy as an institution of higher learning, Mr. Lawson said that the school had been granted tax exemption by the Bureau of Internal Revenue for Federal tax purposes but that the local taxing authorities in Iowa levied taxes against the school. He added:

We pay them under protest. * * * We have paid them ever since we have been there.

In order to obtain more detailed information regarding the purchase, use, and resale of machine tools by the University of Lawsonomy, the committee subpoenaed Cecil Hayter and George Sorensen, president and secretary of the university, respectively. They produced records showing that the university had sold 36 machine tools in the past year and a half at prices totaling \$152,500. They maintained, however, that none of this represented profit since the university had incurred considerable expense in connection with its machine tool program. Further questioning disclosed that the expenses included all costs of operating the university.

In an attempt to establish the educational standards of the University of Lawsonomy and its right to acquire Government surplus machine tools under the World War II disposal program, the committee questioned the witnesses regarding the university's requirements for admission. Messrs. Hayter and Sorensen stated that the school did not require a diploma of any kind. From the record:

Senator MOODY. I would like to ask you, Mr. Sorensen, what your understanding is of the qualifications for entry in the university.

Mr. SORESENSEN. They are more or less moral qualifications. They have to be rid of all these degrading habits—smoking and drinking and gambling—and have to lead a good, clean life; good, clean habits. That is one of your main qualifications.

Senator MOODY. I see. If you do not smoke or drink or gamble you have a good chance of getting in; is that right?

Mr. SORESENSEN. Exactly.

Senator MOODY. Are there any scholastic qualifications for entry in the university?

Mr. SORESENSEN. Your knowledge of lawsonomy is your qualification. That is based on morality.

The witnesses further testified that the university conferred a degree of "knowledgian" but that it took 30 years to acquire the degree. They stated that Alfred Lawson was the only person who has been awarded the degree to date. There are 20 students enrolled at the school now. They come and go at will, sometimes staying a few days and other times staying for years. There is no faculty as such at the university, and no fees. Students and teachers alike study and discuss the writings of Alfred Lawson. Mr. Hayter, president of the university since 1950, testified that he is now studying theology. He said that he had not previously attended college but had been employed by the Ford Motor Co. for 20 years as a job setter in the automatic screw machine department. Mr. Sorensen stated that prior to his appointment to his present position at the university in 1948 he had operated a steel fabricating business and had attended a junior college for a year and a half.

When questioned as to the use made of the machine tools acquired by the University of Lawsonomy, Mr. Sorensen testified that he discovered after the machines were delivered to the school that they were high production machines and not readily adaptable to student instruction. He said that they were thereafter placed in Machinery Hall, a separate building on the university grounds, where they were exhibited to the students. From the record:

Mr. SORESENSEN. We stored and used them for showing the various students what they were. That is about all you could do with them.

Senator MOODY. You just took the students in and showed them the machines and said, "That is what a machine is like." Is that the idea?

Mr. SORESENSEN. What it is like, what it is used for, the general application. That is about all you could use them for.

Attempts by the committee to determine the terms of the contracts under which the University of Lawsonomy took possession of the machine tools proved fruitless. Records of the university disclosed only meager evidence consisting largely of sales receipts. Records of the War Assets Administration in many instances failed to show sales to the university although representatives of the university were able to produce evidence indicating purchases of equipment from that agency. A survey of the records of other educational institutions who had purchased surplus machine tools from the Government disclosed other gross deficiencies in administration of the surplus machine tool program. Where contracts were located the terms and conditions of sale varied widely, and in many instances the committee was unable to locate any sales contracts and school representatives questioned about their right to title to the equipment pleaded ignorance.

The following table sets forth available data with respect to the purchase and sale of machine tools by the University of Lawsonomy.

Price history on machine tools purchased by Des Moines University of Lawonomy, Des Moines, Iowa

10

MACHINE-TOOL SHORTAGES

Number of units	Machine tools	Cost of acquisition to Government	Date sold to University of Lawonomy	Net proceeds to Government on sales to University of Lawonomy	Date sold by University of Lawonomy	Sales made to	Sales price
1	No. 10 Sundstrand production lathe, serial No. 10-623.....	\$7,067.54	June 24, 1947	\$44.63	June 25, 1951	} Paul's Machinery, Detroit, Mich.....	\$23,000.00
1	Model 81 Heald grinder, serial No. 19951.....	6,982.00	do.....	49.09	do.....		
1	Heald Borematic No. 48A, serial No. 22694 ¹		do.....		Oct. 17, 1949	} Louis Finby.....	2,200.00
1	No. 34-36 Duplex milling machine, serial No. 4B33D1L-2.....	14,379.10	do.....	77.50	Mar. 8, 1951		
1	No. 47A Heald Borematic, serial No. 2868.....	8,218.00	do.....	51.54	Oct. 17, 1949	} Joseph Behr & Sons, Inc., Rockford, Ill.....	11,000.00
1	Gisholt turret lathe, saddle type 1-L, 18 by 50 serial No. 63910. ¹		do.....		July 10, 1950		
1	Gisholt 3-L lathe, saddle type, serial No. W-695-24.....	16,358.44	do.....	369.70	Sept. 11, 1950	} Machinery Sales, Detroit, Mich.....	8,000.00
1	Cincinnati plain cylindrical grinder, serial No. 5P1C1L-89 ¹		do.....		Oct. 17, 1949		
1	Midland lathe No. 5, ram type, single spindle, serial No. 842-50843.	6,827.50	do.....	55.91	Feb. 15, 1951	} Barr Machinery Co., Chicago, Ill.....	22,500.00
1	Cincinnati milling machine 4-48, hydromatic, serial No. 3842P1L-50.	454.00	do.....	113.05	do.....		
1	Cincinnati milling machine No. 3, serial No. 2A3VIL-120.....	8,562.10	do.....	77.50	do.....	} Paul's Machinery, Detroit, Mich.....	21,750.00
1	Cincinnati milling machine 3-24 serial No. 4B31P1L-2 ¹		do.....		Aug. 13, 1951		
1	Allen single spindle drill.....	1,275.00	do.....	13.40	do.....	} Barr Machinery Co., Chicago, Ill.....	7,000.00
1	Leland-Gifford 3 spindle drill, serial No. 2LMS-4839.....	7,290.00	do.....	32.85	do.....		
1	Seneca Falls Lo-Swing automatic lathe, R-14, serial No. R6365. ¹		do.....		do.....	} Machinery Sales, Detroit, Mich.....	10,000.00
2	Fellows Gear Shapers No. 712 serial No. 22716-22717.....	14,797.14	June 24, 1947	99.22	do.....		
1	Proconier tapping machine, serial No. 860, plus 4 by 8-foot plate.	482.02	do.....	18.15	do.....	} Banner Machine Co.....	15,000.00
1	Miller and Profiler, Pratt & Whitney, single spindle, serial No. 336.	7,993.00	do.....	73.28	do.....		
1	Heald No. 22 rotary surface grinder, serial No. 20202.....	4,955.00	do.....	54.03	Nov. 8, 1951	} Joseph Behr & Sons, Inc., Rockford, Ill.....	7,200.00
1	Boring machine stoke unit, Simplex model 2-B, serial No. DB-2B6-340.	2,903.00	do.....	19.43	do.....		
1	Hydro-Tel Cincinnati vertical milling machine, serial No. 1H1VIL-174.	25,135.00	July 22, 1947	1,256.75	Aug. 17, 1951	} Banner Machine Co.....	15,000.00
1	Model 1-18 Sundstrand production mill, serial No. 31-1259.....	6,790.00	June 24, 1947	153.45	Nov. 8, 1951		
1	08 Cincinnati vertical milling machine, serial No. 47V-1062-105.	4,701.54	do.....	26.05	do.....	} Joseph Behr & Sons, Inc., Rockford, Ill.....	7,200.00
3	Bakewell tapping machines (R75) (R76) (R77) ¹		do.....		Nov. 8, 1951		
1	"Imp" lathe, serial No. 25-N-952 ¹		do.....		Nov. 17, 1951	} Joseph Behr & Sons, Inc., Rockford, Ill.....	7,200.00
1	Lees Bradner thread milling machine, A 501.....	8,864.01	June 24, 1947	200.83	do.....		
1	Barber-Colman HRS Hob sharpener, 259 ¹		do.....		do.....		

1	Leland-Gifford drill press No. 4631.....	1,300.00	do.....	13.48	Aug. 24, 1950	Louis Finby.....	2,000.00
1	Model CG-19 gear grinder, serial No. 2808.....	7,726.00	do.....	86.45	Nov. 23, 1951		
1	Leland-Gifford 2 spindle-drill press, surface plate, 36 by 68.....	2,905.00	do.....	43.05	do.....		
1	Lees-Bradner milling machine, serial No. CT-144.....	8,864.01	do.....	200.33	do.....	U. S. Equipment Co., Detroit, Mich.....	13,650.00
2	4T Sellers tool grinders (03-1214)-(03-1325).....	2,445.00	July 22, 1945	122.00	do.....		

¹ Information relating to cost of acquisition and proceeds to Government not available.

INVENTORY OF MACHINE TOOLS RETAINED BY DES MOINES UNIVERSITY OF LAWSONOMY

1	DPC 1341, speed lathe.....	280.32	June 24, 1947	2.20			
1	DPC 1338 lathe, polishing, Cincinnati.....	280.32	do.....	6.34			
1	Honing machine, precision.....	485.70	do.....	13.11			
1	4310-4 drilling machine, Taylor-Fenn M-Stag No. W4M-4310-2.....	735.00	do.....	16.61			
1	DPC-312957 tap-conditioning machine, serial No. DIR-463.....	1,033.40	do.....	28.32			
1	DPC No. 137-1 riveting machine, serial No. 1A-1014.....	217.80	do.....	5.36			
1	Tapping machine, Kaufman, serial No. 10-149.....	1,500.00	do.....	48.90			
1	CHOD 30435 turret lathe, Warner-Swasey model No. 4, serial No. 372-148-113955.....			65.54			
1	Bodine dial type drilling and tapping machine.....	6,798.00	July 27, 1947	1,378.00			

In the light of the testimony received from the representatives of the Des Moines University of Lawsonomy the committee was at a loss to understand how the university could qualify for a Federal tax exemption, particularly in view of the contrary stand taken by local taxing authorities in Iowa. The committee was therefore relieved to note the action taken by the Bureau of Internal Revenue when it announced on May 15 that the university's tax exemption had been withdrawn.

MACHINE TOOL RECOVERY PROGRAM

From the standpoint of the small manufacturer, it was apparent from the testimony of witnesses already heard by the committee, particularly that given by the representatives of the University of Lawsonomy, that there must be a vast reserve of critically needed machine tools lying idle in educational institutions throughout the country and that prompt, aggressive action should be undertaken to recover those tools and place them in defense production. The committee was aware of the fact that a program to this end had been undertaken by the Federal Security Agency and the National Production Authority in conjunction with the military agencies and therefore called representatives of those agencies to report on the progress of the program.

Jack K. Woll, Chief of the Used and Available Tools Section, Metalworking Equipment Division, National Production Authority, and also Chairman of the Institutional Allocation Board, testified that NPA, the Federal Security Agency, and the Department of Defense had entered into an agreement effective January 15, whereby FSA had the responsibility for locating and preparing inventories of available tools in educational institutions and for establishing title in each individual case. Tools identified under this procedure as available for lease or purchase by defense contractors are reported by FSA to the Allocation Board for assignment in terms of existing urgency lists.

Under this program, Mr. Woll stated, 289 units had been recovered and allocated to defense contractors and the armed services during the 5 weeks since the initiation of the project. According to Mr. Woll, the approximate cost of these machines at current prices would be \$692,-890, but the actual cost to the Government in recovering them had been only \$30,228.97, indicating a net saving of \$662, 661.03. Confirming information already developed by the committee, Mr. Woll testified that the program, successful as it was to date, had been hindered and complicated by the absence of accurate records covering the original transactions.

Willis T. Frazier, Chief of the Surplus Property Utilization Division, Federal Security Agency, stated that FSA had first explored the possibility of reclaiming unused machine tools from educational institutions during the fall of 1951, prior to formulation of the agreement of January 15, 1952, referred to by Mr. Woll. He stated that the Dallas office of FSA, at the request of the Southern Procurement Division of the Air Force, had surveyed schools in its district during October, November, and December of 1951. Five FSA field men working on this project located and assisted in delivery of 118 machine tools valued at \$727,000 with a cost to the Government of \$131,000. In explaining the cost figure Mr. Frazier pointed out that although many of the schools could show clear title to the equipment and thus were entitled to claim full value for the machine tools, the vast

majority of them accepted only their out-of-pocket costs in returning the tools to the Government.

With regard to FSA progress under the January 15 agreement, Mr. Frazier testified that since that date the agency had located 2,008 tools and had reported 402 to the Allocation Board. Of this number, as Mr. Woll testified, 289 had been allocated and were being claimed by defense contractors or the Military Departments.

Mr. Frazier advised the committee that FSA was financing its phase of the program under a transfer of \$90,000 from the Department of Defense. Expenditures from this fund are limited to \$15,000 a month for 6 months. In response to questioning Mr. Frazier stated that an increase in funds available to FSA for this program would result in the more rapid recovery of tools.

The following table reflects the progress of the machine tool recovery program as of May 15, 1952.

Machines located.....	2, 681
Machines reported to Allocation Board.....	875
Machines allocated to defense contractors or Department of Defense.....	397
Machines referred to Surplus Materials Division, Department of the Navy.....	372
Estimated current value.....	\$1, 764, 716
Cost of direct procurement.....	204, 442
Cost of FSA personnel and services.....	52, 500
Total cost to U. S. Government.....	256, 942
Savings to U. S. Government.....	1, 507, 774

GOVERNMENT MEASURES TO MEET THE DEMAND FOR MACHINE TOOLS

As noted previously, the committee was aware of the fact that the machine-tool industry had suffered a severe depression between the end of World War II and Korea and that it faced a number of complex problems in its attempts to meet the demand for its products following the Korean outbreak. One of the gravest problems was that of price ceilings. The general ceiling price regulation issued on January 26, 1951, froze prices on all manufactured goods at those prevailing on products shipped during the base period, December 19, 1950, through January 25, 1951. Due to the long lead time of 6 to 12 months required to build machine tools, this meant in many instances freezing machine-tool prices at levels established before the Korean war, without allowance for mounting labor and material costs. The machine-tool industry was reluctant to expand its production in the face of this obstacle.

Another grave problem was that of materials. Like every other manufacturing operation, the machine tool industry was hit by material shortages after Korea. The delay on the part of the responsible Government agencies in recognizing the need for special priorities on materials for the industry delayed it considerably in its efforts to get on with the job. Other problems included wages, manpower, facilities, and financing.

The committee knew that steps had been taken in the summer of 1951 to meet these problems. A directive issued by the Office of Defense Mobilization on July 9, 1951, had laid out a specific program to break the machine tool bottleneck. The committee was partic-

ularly anxious to determine the status of the program undertaken to implement the ODM directive and to ascertain what other steps might be needed to increase the flow of machine tools. It therefore questioned key personnel concerned with the machine tool program in both the military and the civilian agencies of the Government as well as representatives of the machine tool industry and spokesmen for some of the country's largest and most vital defense contractors.

Swan E. Bergstrom, Director of the Metalworking Equipment Division of the National Production Authority, summarized the steps undertaken by NPA to implement the machine tool program. Portions of Mr. Bergstrom's testimony are worthy of special note. He stated, in part:

The turning point in the battle to expand machine-tool production came in July 1951, when the Office of Defense Mobilization issued a directive ordering the various agencies concerned to undertake a synchronized program. Since that date progress has been spectacular. Since I came to the NPA as Director of the Metalworking Equipment Division in October 1951, it has been my task to execute those portions of the ODM directive which pertained to the NPA, and to suggest additional steps which became desirable as the situation developed.

Shipments of the machine-tool industry, including metal cutting and forming machine tools, for the month of January 1952 were approximately \$86 million. These are preliminary figures, since reports from all manufacturers have not yet been received, so that the total may be even larger. This figure should be compared with a little over \$25 million for July 1950, and approximately \$48 million for July 1951.

In the 6 months since the issuance of the ODM directive (August 1951-January 1951) the rate of production has nearly doubled. If you will compare this rate of progress on a chart of machine tool production over the last 20 years you will see that the progress in this period roughly approximates the best rate of progress ever attained, including the peak of World War II. (See chart.)

I am confident that \$5 million can be added to the machine-tool output each month through the remainder of the fiscal year 1952. If this production rate can be attained, the total machine-tool output for the fiscal year 1952 will be something over a billion dollars. The total for the 18 months from January 1951 through June 1952 will be in the neighborhood of \$1,345,000,000. This will surpass the goal of \$1,305,500,000 originally established for that period when the defense program got under way.

By July 1, 1952, the machine-tool industry will be producing at a rate of around \$1,380,000,000 a year—substantially more than twice the rate of July 1951 and over four times the rate of July 1950. Even after adjustment for price differences, this figure compares favorably with the peak World War II output of \$1,540,000,000 achieved in 1942.

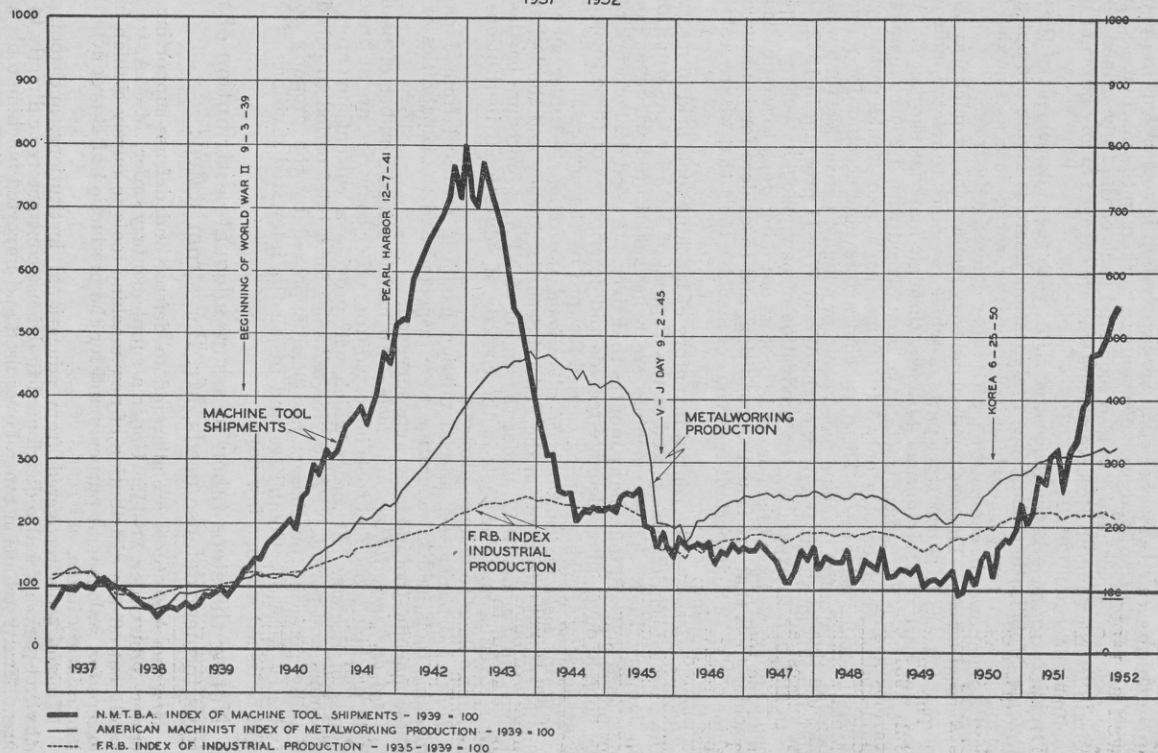
Government actions taken at the instance of NPA which have made possible this performance by the machine tool industry since July 1951 include the following:

Pricing.—A price ceiling adjusting the base period to take into account the depressed condition of the machine tool industry prior to the Korean outbreak was established by the Office of Price Stabilization in August 1951.

Material allocations.—The level of material allotments to the machine tool industry under the controlled materials plan has been well in excess of the average allotment level. I think I can say that since CMP went into effect with the third quarter of last year the machine tool industry has been allocated all of the steel, copper and aluminum it required.

Material priorities.—When it became evident in the fourth quarter, which was the first period of full operation under CMP, that machine tool builders were having difficulty getting the mills to accept their orders, we gave them a special priority designated Z-2. This gave to the machine tool industry the same preference for materials and components as that accorded to the military and Atomic Energy Commission programs. The same priority was made applicable on January 21 to warehouse purchases. This should particularly interest your committee because the people who get their material from warehouses are, in the majority of cases, machine tool builders who would be classed as small business. Of approximately 1,200 subcontractors now contributing to machine tool production, more than a thousand are small businesses that will find it easier in the future to get the material they need.

MACHINE TOOL SHIPMENTS METALWORKING PRODUCTION AND TOTAL INDUSTRIAL PRODUCTION 1937 - 1952



Pool orders.—In order to promote the rapid expansion of the machine-tool industry, the General Services Administration, on the recommendation of NPA, has placed pool contracts totaling more than a billion dollars. These so-called pool orders encourage production in advance of firm private orders and provide financial assistance to the producers.

Draft deferments.—The Selective Service System is cooperating in the machine-tool program by offering draft deferments to workers in the machine-tool industry. The Defense Department has also requested each of the three armed services to refrain from calling up Reserve officers who are engaged in any phase of machine-tool manufacture.

Wage increases.—At the request of NPA, with the endorsement of the Office of Defense Mobilization, the Wage Stabilization Board is giving prompt attention to applications from the machine-tool industry for wage increases needed to retain skilled manpower in competition with other defense industries.

Subcontracting.—The machine-tool industry realized that a quick way to increase production was to subcontract parts or whole machines to related industries that had lost part of their normal business through material shortages. With the assistance of NPA, subcontracts have been placed with 1,200 companies, over a thousand of which employ only 5 to 50 men each, and would certainly be considered small businesses. These subcontractors now account for more than 20 percent of the entire machine-tool output, or a higher percentage than was attained through this means at the peak of the World War II program in 1942.

In addition to expanding the production of new machine tools as rapidly as it can be done, we have taken or are in process of taking steps to secure second-hand machine tools that are in usable condition, and to explore foreign sources of machine tools. The important reservoirs of machine tools that we are seeking to tap are the following:

Service reserves.—The central inventory of machine tools held in reserve by the three armed services was placed at the disposal of NPA by the Munitions Board in January 1952. These machines are being substituted wherever possible for new ones that will take many months to deliver. A good deal of work remains to be done in developing adequate records and descriptions of these tools, and their exact locations. This is being carried forward by the services.

Machine tools in the hands of educational institutions.—Under an agreement finally entered into between the Federal Security Agency and the Department of Defense in January 1952, under the urging of NPA, a procedure has been set up for recovering machine tools in the custody of educational institutions, and for assigning them to defense projects.

Japanese mission.—A special mission has just returned from Japan, where machine tools held in reparation were inspected and the capabilities of the Japanese machine-tool industry were surveyed.

Used and imported machine tools.—An undetermined number of used and rebuilt machine tools, and tools imported from other countries, are at present in the hands of dealers. An order which will provide a current inventory of these machines and permit NPA to "freeze" sales for a brief period to permit inspection by potential purchasers has been approved by the properly constituted Industry Advisory Committee and by all the interested divisions of NPA. It will be issued within a few days.

Noting the steps taken to assure adequate distribution of machine tools to meet defense needs, Mr. Bergstrom stated:

New machine tools are allocated to defense and defense-supporting industry under NPA Order M-41. Under a supplementary order, M-41A, we have virtually cut off the distribution of new machine tools to purely civilian industry except for replacement purposes and for the production of B products that enter into military items.

Machine tools recovered from educational institutions, and tools from the service reserves are also distributed to defense contractors or directly to the services. The distribution control over used and imported machine tools will be less formal, but here also we expect to exercise considerable influence in determining where these machines are to go.

After a very careful analysis by the Joint Chiefs of Staff, and the armed services, of the relative urgency of the military programs with respect to their needs for machine tools, NPA was given a master preference list in January 1952. This secret document, which indicates the military programs in their order of preference, is our internal guide for directing production and allocating the distribution of machine tools.

I know this committee, like other committees of the Congress, is interested in assessing where we stand today in the light of the progress that has been made in recent months on the machine tool program. Our over-all backlog today represents approximately 17 months of the industry output. This compares with 23 months in July 1951, which is an improvement of 6 months in the delivery picture of the machine tool industry. Moreover, with the exception of about eight types of machine tools, not including special machines, the majority of the machine tool builders will have open dates in about 12 months and under; and by July 1, there will be a proportionate further improvement in the delivery situation.

In its desire to seek constructive suggestions looking toward the increased production of machine tools the committee questioned each witness closely to this end. Mr. Bergstrom was of the opinion that the major bottlenecks in the current machine-tool program had been broken and that the matter of filling current machine tool orders was no longer a major problem. He suggested that "the two most critical problems in the machine tool area today * * * include rather (1) the development of additional orders that will keep our tooling in step with our design and our technological advance; and (2) the maintenance of a healthy and vigorous machine tool industry which should never again be permitted to sink to the low point it reached in July 1950 when deliveries sank to \$25 million a month." While some skeptics might hold that the suggestions of Mr. Bergstrom, a vice president of the Cincinnati Milling Machine Co., were influenced by his industry background, it was interesting to note that other witnesses not associated with the machine-tool industry echoed Mr. Bergstrom's sentiments in later testimony.

Following his appearance before the committee Mr. Bergstrom furnished to the chairman of the subcommittee a report wherein he supplemented his testimony with additional detailed information relating to the implementation of the machine-tool program. The following excerpts from that report were of particular interest to the committee:

I should like to comment upon the physical expansion of the industry. The available facilities at the time of Korea were not sufficient to take care of anywhere near the production that was needed. The machine tool industry was given a priority in processing of tax amortization certificates and up to this time facilities valued in excess of \$176,000,000 have been certified. Besides that, we have recommended facilities contracts under which GSA has purchased and made available to the industry machine tools and equipment on a rental basis so that machine tool manufacturers who do not feel that they can obligate themselves on expenditures for facilities on their own may utilize the expansion facilities provided by the Government. A large number of machine tool manufacturers have availed themselves of this program.

In August 1951 machine tool builders were given top priority for obtaining machine tools for their own plants and the Metalworking Equipment Division of NPA has made every effort to see that the builders got the equipment so that they could make machine tools. The armed services, particularly the Navy, have been very helpful in releasing to the machine tool builders Navy-owned machines that were not in operation on Navy contracts. This has been of inestimable help because the machines were available immediately and could be put to use in the shortest period of time.

The need for special consideration in the allocation of material for the machine tool industry was recognized as far back as May 1951. Under order M-61 the industry was given priority to purchase materials up to 140 percent of the amount used in the first quarter of 1951. This was based on the fact that machine tools have such a long lead time and in building up an inventory the industry had to be guaranteed a substantial amount of material to increase production. These steps did not adequately take care of this expanding industry, so directive actions were taken in October 1951, in order to help out special cases. Subsequently, we found that it was necessary to issue a special priority that would give machine

tools equal status in obtaining material as the military and Atomic Energy, and so on December 11, 1951, the machine tool builders were given a special Z-2 rating for materials and components that would give them the same standing in cashing their CMP tickets as the military and AEC. This applies to the purchases at the mill; and a similar order was issued to apply to machine tool builders who purchase from warehouses so that any possible road block to obtaining material was completely dissolved. * * *

On March 7, 1952, NPA took action on the distribution of used and imported tools. When a builder cannot supply a machine tool needed for a defense contract it has been the policy of the Agency to help the contractor to locate a used tool. NPA order M-101 provides for a complete running inventory of the used equipment available in the hands of dealers in this country and a large number of tools have been made available for defense contractors through this medium. In cooperation with the Federal Security Agency and Department of Defense, NPA has located and made available to the armed services machine tools of various types that are in the hands of educational institutions. At the end of World War II these tools were given to educational institutions by the War Assets Administration and the armed services. Over 450 of these tools have been allocated to the various contractors of the armed services to date, and this number is being continually increased.

During the last 6 months the NPA Metalworking Equipment Division and the Labor Department have worked very closely together to help solve the very tight manpower problem in the machine tool industry, and I want to pay particular tribute to the Department of Labor and the help that it has given the industry in assisting in solving the labor shortage in the various tight labor spots. The Wage Stabilization Board has been very helpful in expediting the various wage cases before it and the fullest cooperation of these agencies has made it possible to meet the very difficult labor situation that faced us 6 months ago. * * *

With regard to Mr. Bergstrom's comments on the matter of furnishing adequate materials to manufacturers of machine tools, the accompanying tables indicate the types and amounts of materials allocated by NPA during the first and second quarters of fiscal 1952 to the Bullard Co. of Bridgeport, Conn., one of the country's major producers of machine tools. It is interesting to note that in many instances the company was able to return small amounts of material to NPA.

Recap of CMP-4B's for the Bullard Co., product code 3541, first quarter, 1952

Material code	Initial first quarter request C-105129	Nov. 9, granted on initial first quarter request C-105129	Percent of request granted on initial application C-105129	Nov. 20, requested on first quarter supplemental C-105129A	Dec. 10, granted on first quarter supplemental C-105129A	Total granted on first quarter C-105129 and C-105129A	Percent of initial request granted on C-105129 and C-105129A	Second supplemental request Dec. 15, granted Dec. 28, C-105129B	Total granted on first quarter, C-105129, C-105129A, and CMP-10	Percent of initial request granted on C-105129, C-105129A, and CMP-10	Third supplemental request Feb. 13, granted Feb. 14, CMP-10
10.....	1,995	1,793	90	202	182	1,975	99	0	1,975	99	0
13.....	223	197	88	26	23	220	99	0	220	99	0
14.....	9	9	100	0	0	9	100	0	9	100	0
20.....	1,160	1,019	88	141	113	1,132	98	145	1,277	110	30
30.....	895	785	88	110	88	873	98	0	873	98	0
40.....	6,516	5,857	90	0	0	5,857	90	0	5,857	90	253
50.....	3,716	3,340	90	376	338	3,678	99	1,350	5,028	135	0
60.....	172,964	155,494	90	17,470	15,723	171,217	99	0	171,217	99	11,350
70.....	15,846	13,913	88	1,930	1,544	15,457	98	0	15,457	98	0

Material code	Total granted on first quarter C-105129, C-105129A, and 2 CMP-10's	Percent of initial request granted on C-105129, C-105129A, and 2 CMP-10's	Fourth supplemental request Feb. 19, granted Feb. 20, CMP-10	Total granted on first quarter C-105129, C-105129A, and 3 CMP-10's	Percent of initial request granted on C-105129, C-105129A, and 3 CMP-10's	Fifth supplemental request Feb. 28, granted Feb. 28, CMP-10	Total granted on first quarter C-105129, C-105129A, and 4 CMP-10's	Percent of initial request granted on C-105129, C-105129A, and 4 CMP-10's	Returns on CMP-12's		
									Feb. 5, 1952	Mar. 11, 1952	Apr. 9, 1952
10.....	1,975	99	0	1,975	99	0	1,975	99	100	0	74
13.....	220	99	0	220	99	0	220	99	0	0	58
14.....	9	100	0	9	100	0	9	100	0	0	7
20.....	1,307	113	0	1,307	113	35	1,342	116	0	0	16
30.....	873	98	0	873	98	0	873	98	101	0	0
40.....	6,110	94	0	6,110	94	0	6,110	94	0	2,000	384
50.....	5,028	135	0	5,028	135	0	5,028	135	0	0	2
60.....	182,567	106	30,000	212,567	123	0	212,567	123	0	0	4,415
70.....	15,457	98	0	15,457	98	0	15,457	98	3,000	1,500	297

NOTE.—80 percent military business shown on CMP-4B for first quarter 1952.

EXPLANATION OF MATERIAL CODES

10—Carbon steel in tons.
13—Plate steel in tons.
14—Structural steel in tons.
20—Alloy steel in tons.
30—Stainless steel in pounds.

40—Copper brass mill in pounds.
50—Copper wire mill in pounds.
60—Copper foundry in pounds.
70—Aluminum in pounds.

Recap of CMP-4B's for the Bullard Co., product code 3541—2d quarter, 1952

Material codes	Initial second quarter request C-154493	Feb. 12, granted on initial second quarter request C-154493	Percent of request granted on second quarter request C-154493	First supplemental requested Feb. 13, granted Feb. 14, C-154493A	Total granted on second quarter C-154493 and C-154493A	Percent of initial request granted on C-154493 and C-154493A	Second supplemental request Mar. 28, granted Apr. 1, C-154493B	Total granted on second quarter C-154493, C-154493A, and CMP-10	Percent of initial request granted on C-154493, C-154493A, and CMP-10	Third supplemental request Apr. 4, granted Apr. 7, C-154493, C-154493A, and 2 CMP-10's	Total granted C-154493, C-154493A, and 2 CMP-10's	Percent of initial request granted on C-154493, C-154493A, and 2 CMP-10's	Returns on CMP-12's	
													Feb. 26, 1952	Apr. 9 1952
10-----	1,907	1,563	82	161	1,724	90	100	1,824	96	0	1,824	96	0	0
13-----	170	153	90	0	153	90	0	153	90	0	153	90	0	0
14-----	10	9	90	0	9	90	0	9	90	0	9	90	0	0
20-----	1,155	1,019	88	0	1,019	88	125	1,144	99	65	1,209	105	0	0
30-----	821	785	96	0	785	96	0	785	96	0	785	96	663	0
40-----	3,603	3,385	94	2,200	5,585	155	0	5,585	155	0	5,585	155	0	0
50-----	4,668	4,228	91	0	4,228	91	500	4,728	101	0	4,728	101	0	0
60-----	181,303	163,172	90	0	163,172	90	0	163,172	90	0	163,172	90	15,000	0
70-----	12,909	11,618	90	0	11,618	90	0	11,618	90	0	11,618	90	0	3,000

NOTE.—No military business shown on CMP-4B for second quarter 1952.

EXPLANATION OF MATERIAL CODES

10—Carbon steel in tons.
 13—Plate steel in tons.
 14—Structural steel in tons.
 20—Alloy steel in tons.
 30—Stainless steel in pounds.

40—Copper brass mill in pounds.
 50—Copper wire mill in pounds.
 60—Copper foundry in pounds.
 70—Aluminum in pounds.

During his testimony Mr. Bergstrom commented briefly on a special mission which had been sent to Japan to inspect machine tools held in reparation and to survey the capabilities of the Japanese machine-tool industry. Mr. Noble Clark, Chief of Foreign Activities for the Metal-working Equipment Division of the National Production Authority, testified before the committee shortly after his return from Japan where he served as chief of a three-man team of experts borrowed from the machine-tool industry to conduct a survey in Japan on behalf of NPA. Mr. Clark stated that the group was primarily interested in Japan "as a source of machine tools for our defense program." Commenting on the results of the Japanese mission, Mr. Clark said:

Fourteen dry storage areas were visited by the mission and approximately 26,000 machine tools inspected. The search was concentrated upon machines of original American manufacture in the sizes and types now in critical demand for our defense program. All machines were found to have been well-preserved under the supervision and regular inspection system of our occupying authorities. The Japanese themselves are particularly good at such work.

Although many machines were observed that were of American origin, the actual number of machines discovered in what we call our critical area was disappointing. Heavy planers, horizontal boring mills, large vertical turret lathes, and large radial drills were very few in number. Milling machines, turret lathes, and smaller radial drills dominated the list of about 150 acceptable American machine tools. * * *

The observation of thousands of Japanese-built machine tools in reparations custody (mostly copies of western machines) fairly well confirmed the Japanese-released figures that their machine-tool production reached a peak of 60,134 units in 1943 with the establishment of about 445 firms in the field. To reach such a production, they must have obtained a stage of tooling up and experience that gave them many advances in the art over their prewar level. Today, however, their production is about 5,000 units per year and only about 33 companies are actually producing machine tools, of which only 10 are exclusive machine-tool manufacturers.

Economists are well aware of the feast-or-famine cycle of the machine-tool industry whether in America or any other part of the world. In Japan, at present, the famine end of the cycle is current.

The mission, therefore, found relatively few new machine tools in process because of the lack of capital and orders. Most appraisals of their productivity and quality, therefore, had to be made from observations of their shop equipment, methods, etc., rather than from inspection or testing of finished products. Many manufacturers had nothing to show but photographs, drawings, etc., of what they had built in the past or were willing to build in the future. * * *

The Japanese machine-tool industry generally still has a job of original designing to do before models can be offered in any form for export. Assuming acceptable original designs can be arrived at, they have a great asset available in skilled labor. Their machine-tool factory equipment is mostly of prewar vintage and much hand scraping, fitting, etc., is still required to compensate for the accuracies which should normally be obtained from their original machining operations. They lack a precision antifriction-bearing industry, advanced foundry technique, and certain alloy steels. The volume of production being low does not permit large investments in tooling, jigs, fixtures, etc., necessary to interchangeable parts production.

The assets column of the Japanese machine-tool industry is topped by their available skilled labor and the willingness on the part of management to build almost anything. With the proper know-how, presumably from America, added to this, the Japanese machine-tool potential could best be utilized.

If it were desirable or necessary machine tools can be contracted for from Japan of almost any size or type in the limited quantities referred to above, for deliveries ranging from 3 months to 1 year. However, these machines, at present, would have only a quality rating equal to the machines now being imported from certain European countries which have about the same historical pattern of machine-tool production as Japan. They would not be as good qualitywise as our better machine tools. * * *

Mr. Clark stated that in his capacity as Chief of Foreign Requirements, Metalworking Equipment Division, NPA, it was his responsibility to oversee the distribution of machine tools to NATO countries and to act as consultant on the importation of machine tools manufactured abroad, particularly in the European countries. In this regard he noted that under the machine-tool distribution order, M-41, 70 percent of the production of the American machine-tool industry was set aside for use by the military departments and their contractors and that machine tools for export had to come from the remaining 30 percent. The following table shows the percentage of our monthly machine-tool production going abroad during 1951:

Date	Estimated shipments	Percent foreign	Date	Estimated shipments	Percent foreign
1951—January.....	\$33,800,000	9.6	1951—August.....	\$52,900,000	9.5
February.....	36,600,000	10.3	September.....	56,100,000	8.5
March.....	47,000,000	11.1	October.....	65,450,000	9.2
April.....	46,650,000	13.2	November.....	66,850,000	10.9
May.....	51,800,000	8.7	December.....	78,250,000	10.7
June.....	54,050,000	9.5			
July.....	42,800,000	9.0	12 months.....	632,250,000	10.0

In normal times, approximately 20 percent of the production of the American machine-tool industry goes to foreign markets. Mr. Clark stated he was unable to estimate the amount of foreign-made machine tools being imported into this country but stated that there was in preparation an order which would inaugurate a report system to compile this information. Later testimony by representatives of the machine-tool industry reflected their concern over both the decrease in machine-tool exports and the growing competition from abroad in the American market.

EFFECT OF MACHINE-TOOL SHORTAGES ON MILITARY PROGRAMS

At the outset of its inquiry into machine-tool shortages the committee realized that the problems of small manufacturing concerns could not be separated from those of the major producers of defense weapons. It realized that modern manufacturing methods require extensive subcontracting and that the success of any mass-production program depends to a large extent on the interdependence of small and large companies. The committee knew also that machine-tool shortages were delaying the production of defense material by some of the country's largest manufacturing concerns. Before questioning representatives of some of those companies, however, the committee considered it advisable to question the people most directly concerned with vital military programs to determine the over-all impact of machine-tool shortages on those programs. Since airpower plays such a prominent part in present military plans, the committee launched this phase of its inquiry by questioning those most directly concerned with the production of military aircraft for the Air Force.

Harold R. Boyer, Deputy Administrator of the Defense Production Administration for Aircraft and Chairman of the Aircraft Production Board, stated that the controlling factor today in the production of

military aircraft is our ability to produce aircraft engines. By contrast, airplane engine production ran ahead of the production of airframes in World War II. Since Korea a major factor in the production of aircraft engines has been machine tools. According to Mr. Boyer, the first requirements evolved by the Air Force following Korea called for the production of 2,400 engines a month. These requirements were successively cut back to 800 engines a month. In addition the period of peak production was extended from 1953 to 1955. The machine-tool shortage played an important part in the cut-backs. Mr. Boyer testified:

Early aircraft schedules compiled in late 1950 and early 1951 were, in my opinion completely unrealistic. Regarded as target schedules, they were the basis for determining machine tool and material as well as facility requirements.

Certain Air Force schedules of that period which never received official sanction represented production peaks at least three times those of current schedules. Also, the build-up in production was greatly accelerated compared with today's goals. The accomplishment of the earlier aircraft goals within a short-time period meant a machine-tool requirement far beyond the ability of the machine-tool industry to satisfy. * * *

Existing tools were not adequate or satisfactory for new weapon production. The tools of 1940 were unable to manufacture the armament of 1950, particularly in the aircraft field, where jet engines were supplanting the piston type, and subsonic and supersonic aircraft were replacing the slower-speed types. * * *

Today the situation is generally more favorable, but machine tool delivery in selective areas is still the governing factor in accomplishing the present aircraft programs, and I think that is generally true of the other segments of the entire defense output. A great contributing factor to the current state of slight relief from pressure on the machine-tool industry is the stretching out of the military schedules.

The chairman asked Mr. Boyer whether the schedules were stretched out because of the machine tool shortage or because of a budgetary situation. Mr. Boyer replied that the earlier reductions in schedules were due primarily to "the realistic limitation or 'do-ability' of the schedules," but the last broad cut had been due "strictly to budgetary limitations."

Asked whether he believed even the current reduced aircraft engine schedule would be met, Mr. Boyer replied:

I feel that this is a good target schedule in the military sense, that it gives a goal to strive for, sort of like hanging a wiener in front of the dog. He can at least smell the wiener now. He couldn't even see it before with the original so-called target schedules.

The committee learned through its questioning of Mr. Boyer that one of the principal difficulties in the production program was the inability of Mr. Boyer and Mr. Bergstrom to determine just what military items had priority. Without that information they were unable to determine which contractors should receive priority on the delivery of machine tools. The chairman questioned Mr. Boyer and Mr. Bergstrom jointly on this point. From the record:

Mr. BERGSTROM. When I came into NPA on the 15th of October (1951), the first thing I asked for was the master preference list and there was none. We worked hard to get that.

Senator MOODY. That is an amazing thing to me.

Mr. BERGSTROM. It is to me too, and it would probably be more amazing if you knew how hard it was to get it.

Senator MOODY. Why should it be so hard to get?

Mr. BERGSTROM. I do not know. As I said, that is the amazing part of it.

Senator MOODY. Mr. Boyer, why was that?

Mr. BOYER. * * * I submit that it is not the system that is wrong; it is the weak-kneed people who administered the system. * * *

Senator MOODY. I thought we had unification. Do you mean that the three services did not get together until January 1952 on the master list?

Mr. BOYER. That is apparently what it is.

Anyone returning to this effort who had any experience in the last effort immediately wanted to ascertain, as did Mr. Bergstrom, "Well, what do we work with here? Who needs this stuff first?" Well, everybody needs everything on the same priority basis. So obviously we were going to have all of the programs in a semi-state of tooling or semistate of production and readiness, and have nothing coming out the back door.

So the object of the priority system, or the urgency list, is to place first things first and knock them off one at a time in order of their most pressing need.

Senator MOODY. I think that should have been obvious about the 28th of June 1950.

Mr. BOYER. That was my contention. * * *

Mr. BERGSTROM. If we had the master urgency list a year ago, you would have had a lot more production coming out in end items today. We could have put the tools to work on the items that were the most urgent.

Further discussion of the master preference list disclosed that it consisted of a top priority band of 15 programs, five from each of the three services. The code name "brickbat" was used to designate the top priority category. Below this group was a second band consisting of approximately 275 items. According to Mr. Boyer, the programs in the "brickbat" category were all of equal urgency, but in the second band the items were rated in numerical sequence as to priority. Air Force, Navy and Army took turns in that order in designating which of their programs should receive priority in this group. Thus Air Force programs received numerical priority designations 1, 4, 7, etc. while Navy's priorities were numbered 2, 5, 8, etc. and Army 3, 6, 9, etc. Mr. Boyer stated that "somebody apparently flipped a coin to see who got the first draw". He testified that no attempt appeared to have been made to determine the actual urgency of programs as between the services within the group of 275 items.

The committee heard Undersecretary of the Air Force Roswell L. Gilpatric confirm Mr. Boyer's testimony concerning the flip of a coin to decide priorities within the Department of Defense. According to Mr. Gilpatric this was done "in order to get on with the job of having some list." From the record:

Mr. GILPATRIC. The only way that agreement could be reached among the services at this stage—I am talking now of last fall when the urgency list was set up—was to start out with the 12, I think it was at that time, and give each service an equal number, and on that basis each service picked its four more critical programs and put them into this category in which there was no ranking as between the 12.

Senator MOODY. As I understand your testimony, the Air Force was very critical of that decision; is that correct?

Mr. GILPATRIC. Yes; but, Mr. Chairman, in order to get on with the business we felt it was so essential to have some sort of urgency system that we accepted what could be agreed upon at that time. * * *

And I should say that today there is an effort being made to have the Joint Chiefs integrate that urgency list so as to rank the ones that are now on the list in some order of precedence in order to enable the civilian agencies that are helping on the defense-production programs to allocate tools and materials and do the other expediting jobs that have to be done. And there still is not definite action by the Joint Chiefs of Staff in even integration, that is, in putting into an order of preference the items that were in the "brickbat" category.

Senator MOODY. Let's see, this Korean war has been going on for 20 months, has it not?

Mr. GILPATRIC. That is right.

Senator MOODY. And it was only last fall when there was a master urgency list worked out?

Mr. GILPATRIC. Correct. * * *

Senator MOODY. Mr. Boyer testified here that below this "brickbat" list it is spelled out Air Force, Navy, Army, in that order; is that correct?

Mr. GILPATRIC. In order to get on with the job of having a list, the representatives of the three services tossed a coin. The Air Force won the toss. So that in cycles of three we have the first.

John Small, Chairman of the Munitions Board, later contradicted Mr. Gilpatric's testimony regarding the flip of a coin. According to Mr. Small, "the Joint Chiefs are not flipping coins to decide major problems of this kind." Without regard to the flipping of coins, your committee was at a complete loss to understand why it took the Department of Defense 18 months to produce a master preference list and why the list was arranged in such an apparently arbitrary manner. The failure of the Pentagon to move sooner on this obviously urgent step served in large part to explain the confusion and delay in the distribution of machine tools.

Brig. Gen. K. D. Metzger, Chief of the Industrial Resources Division, Air Material Command, Wright-Patterson Air Force Base, testified specifically with respect to the effect of machine-tool shortages on Air Force programs. General Metzger confirmed generally what Mr. Boyer had said on this subject. By way of summary General Metzger stated,

The key to our aircraft productivity and the one resource which is paramount to effective industrial capacity is machine tools. By virtue of their complexity and the length of time required to build them, they represent the most critical limiting factor in our production programs, current and planned.

General Metzger added that "as of today, most machine tools are in short supply." He said that large sizes of the following type machine tools are considered to be in most critical short supply. He also identified the manufacturers against whom most shortages were reported as follows:

<i>Machine tool</i>	<i>Manufacturer</i>
Jig borers	Pratt & Whitney. Moore Special Tool Co.
Die sinking machines	Pratt & Whitney Cincinnati Milling & Grinding Machine Co.
Vertical turning and boring machines	Bullard Co. King Machine Tool Co.
Screw machines	Brown & Sharpe Manufacturing Co. Davenport Machine Tool Co. New Britain-Gridley Machine Co. Cleveland Automatic Machine Co.
Tracer type lathes	American Tool Works Co. Monarch Machine Tool Co. Lodge & Shipley Machine Tool Co.
Milling machines	Cincinnati Milling & Grinding Machines, Inc Kearney & Trecker Corp. Brown & Sharpe Manufacturing Co. Gorton, George Machine Co.
Turret lathes	Warner & Swasey Co. Gisholt Machine Co.
Surface grinders	Blanchard Machine Tool Co. Brown & Sharpe Manufacturing Co. Thompson Grinder Co. Norton Co.
Gear finishing machines	Gleason Works.
Radial drills	American Tool Works Carlton Machine Tool Co. Cincinnati Bickford Tool Co. Cincinnati Gilbert Machine Tool Co. Fosdick Machine Tool Co.
Spar mills	Farnham Manufacturing Co. Onsrud Machine Works, Inc.
Skin mills	Giddings & Lewis Machine Tool Co.

General Metzger also furnished to the committee a summary of Air Force requirements for machine tools requested for delivery in 1952 and 1953. The list was of particular interest to the committee in that it showed not only present Air Force requirements for various type machine tools but also showed a substantial number of machine tools yet to be ordered. The latter data tended to support the earlier testimony of Mr. Boyer to the effect that not all machine-tool requirements are yet reflected on the order boards of machine-tool manufacturers and that substantial quantities of machine tools will be required in the months to come. The complete list read as follows:

	On order	To be ordered	Total units	Percent of total
3411. Boring machines.....	1,964	243	2,207	5.52
3412. Broaching machines.....	684	46	730	1.82
3413. Drilling machines.....	4,431	1,262	5,693	14.23
3414. Gear machines.....	800	185	985	2.46
3415. Grinding machines.....	6,558	1,110	7,668	19.16
3416. Lathes.....	5,438	1,264	6,702	16.75
3417. Milling machines.....	4,818	1,434	6,252	15.63
3418. Planers.....	121	14	135	.34
3419. Miscellaneous machine tools.....	2,569	1,077	3,646	9.11
3441. Bending and forming machines.....	513	321	834	2.08
3442. Hydraulic and pneumatic presses.....	483	236	719	1.80
3443. Mechanical presses, power-driven.....	692	257	949	2.37
3444. Manual presses.....	72	69	141	.35
3445. Punching and shearing machines.....	217	132	349	.87
3446. Forging machines and hammers (not including forging presses).....	316	61	377	.94
3447. Wire and metal ribbon forming machines (not including roll forming).....	19	10	29	.08
3448. Riveting machines (not including power driven, hand riveting machines).....	298	279	577	1.44
3449. Miscellaneous and secondary metal forming and cutting machines.....	98	41	139	.35
3451. Electric arc welding machines.....	434	134	568	1.42
3452. Electric resistance welding machines.....	369	86	455	1.14
3453. Gas welding and cutting machines and apparatus.....	0	18	18	.05
5556. Balancing machines.....	114	11	125	.31
5557. Inspection testing and measuring machines.....	481	233	714	1.78
Total units.....	31,489	8,523	40,012	
Total percentage.....	78.7	21.3		100.00

Rear Adm. John B. Moss, Assistant Chief for Matériel and Services, Bureau of Aeronautics, was asked to comment on the effect of machine-tool shortages on the production of defense weapons for the Navy. He replied, "I think it is quite common knowledge that the shortage of machine tools has kept our production schedule from getting up at this time to where we thought it would be a year or 18 months ago." He stated that the machine-tool shortage was "one of the principal bottlenecks" in the Navy program. Underlying the machine-tool shortage, in the opinion of Admiral Moss, is the great advance made in science and military weapons. From the record:

Admiral Moss. * * * The frightening thing about this is not progress but the acceleration of progress. What you used to allow yourself 4 or 5 years to do, you are now trying to do in a year and a half or 2 years. The same thing is true in the engine field. * * *

There is a greater difference today between present airplanes and World War II airplanes than there was between World War II airplanes and World War I airplanes.

Admiral Moss pointed out that these advances have given the machine-tool industry the problem of designing and building "an entirely new family of tools" and that the very size and complexity of the tools makes for long lead times and resultant delays in delivery.

In answer to a question as to what critical Navy programs were being cut back due to machine-tool shortages, Admiral Moss referred to the J-40 jet engine being manufactured by Westinghouse at Kansas City. He identified the J-40 as a "brickbat" item and stated that 3,800 machine tools will be needed to get the engine into production. As of March 11 Westinghouse had received only 2,000 of the tools; 1,800 additional tools were required of which 400 were critical. Without those 400 tools, according to Admiral Moss, Westinghouse would not be able to go into production on the engine.

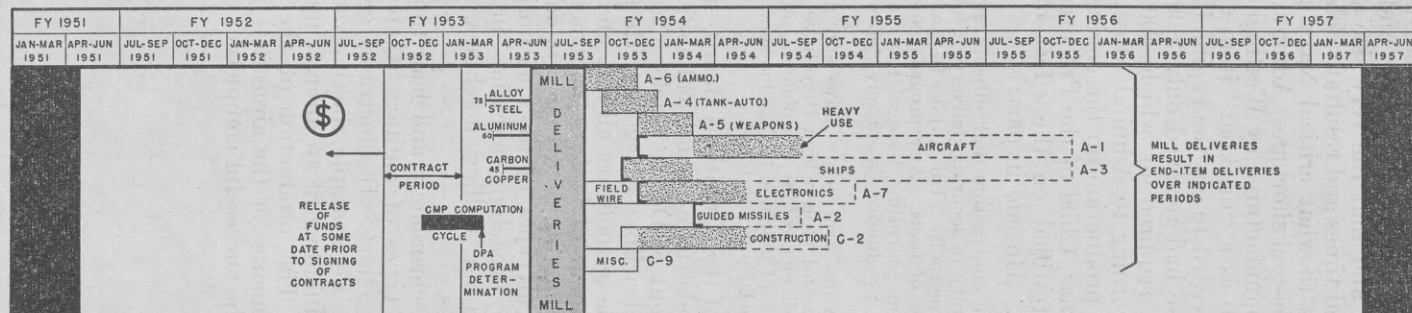
Maj. Gen. John K. Christmas, Chief of the Procurement Division, Department of the Army, testified on the effect of machine-tool shortages on Army programs. He said in part:

Department of the Army prime contractors and subcontractors have experienced, and are experiencing, difficulty in securing delivery of what are termed to be adequate numbers of new machine tools. This applies to practically all production contracts, and to most types of tools. Any program such as the present defense program requires that the peacetime base of the machine-tool industry be expanded because modern production is entirely dependent on machine tools. * * *

At this time, more than 260 Army contractors have submitted requests for improved delivery of several thousand tools which they have on order. Their contracts run from tanks to small electronics components, and their requests include practically all general types of machine tools, plus special tooling, and in some cases single-purpose and special-purpose tools.

John D. Small, Chairman of the Munitions Board, summarized the impact of the machine-tool shortage on critical military programs. He stated that the Department of Defense lacks 8,200 critical tools needed for programs in the "brickbat" category. He added that the promised delivery dates on these tools are all late and that the tools must be received by Department of Defense contractors before the end of this year if they are to maintain current production schedules. He identified the most critical types of tools as horizontal boring, milling and drilling machines, broaching machines, internal grinders, horizontal turret lathes, contour milling machines, skin and spar mills, and tracer control lathes.

By way of illustrating the chronology and lead times involved in the procurement of various types of military weapons Mr. Small presented the accompanying chart. It illustrates graphically that "facts are stubborn things." For example, the time required from the letting of a contract for the building of an aircraft until its delivery may run 3 years or more. The production of the machine tools necessary to build the components for the aircraft is just one of the many problems incident to the successful completion of a weapon of war.



Decreases can take place at any time
Increases must await materials

Facts are stubborn things

For new production from
"cold" lines add approx.
9 months before mill
delivery quarter.

MUNITIONS BOARD

Clay P. Bedford, Special Assistant to the Secretary of Defense, highlighted a facet of the machine-tool problem not previously emphasized by the other witnesses. He stated that he considered our neglect of process engineering between World War II and Korea to be the prime reason for the current lag in defense production. From the record:

Mr. BEDFORD. I think we have to recognize that one of our fundamental troubles is development of the equipment that we are building so urgently, which was stifled in the years 1946, 1947 and 1948, and that one of the great difficulties was trying to produce without having the development work and the process engineering fully done.

We are designing and building at the same time, and whereas the lack of availability of machine tools on call is a contributing factor, I really believe that our failure to pursue diligently a course of development during those interim years between the two wars is the greatest single contributing factor. * * *

I don't want to minimize the fact that we are short of machine tools today. We are short of machine tools, and we will require machine tools for some period of time yet. * * *

Senator MOODY. You are convinced that the basic reason for (the machine tool shortage) is the failure of the United States Government to follow up in 1946 to 1948 an aggressive experimental scientific-research program in the field of aircraft; is that correct?

Mr. BEDFORD. Including the process engineering, the development right down to the point where you produce the end item. Don't overlook that portion of our economy today. As you so well know from the Detroit area, once you develop a product, a lot of time is spent in devising ways and means of producing it, and that various savings, tremendous savings in time, tools, costs, are created due to the ingenuity of the people of Detroit, a center of process engineering. * * *

(Today) we are doing the process engineering and the production at the same time. That is difficult and that creates late ordering of tools, and the late ordering of tools creates late delivery of tools. It is a contributing factor.

HEAVY-PRESS PROGRAM

Your committee had received reports to the effect that there had been unnecessary delay in the implementation of a heavy-press program in this country. It was stated that heavy presses could eliminate to a considerable degree the amount of machine-tool equipment needed to produce aircraft parts but that for some unexplained reason the building of such presses in this country had been delayed although a program to this end had first been proposed during the early days of World War II. The committee realized that heavy presses by their very size and nature could not be used by small manufacturing concerns; however, since the use of heavy presses would reportedly release great numbers of machine tools, the possibility of relieving the machine-tool shortage through this avenue prompted your committee to examine this phase of the machine-tool problem.

The nature and utility of heavy presses was first discovered during the early stages of World War II. Allied forces examining captured German planes found that they contained parts and members of unique structure. Entire wing sections and spars of one-piece construction were among the components that excited the interest of metallurgical engineers. They were found to be exceedingly strong. The theory was advanced that they had been formed on giant forging or extrusion presses. Allied engineers were not aware of the existence of such presses but military intelligence confirmed their existence in German armaments plants. Immediately upon the conclusion of the war with Germany in 1945, a special mission headed by Lt. Gen.

Kenneth B. Wolfe, of the Air Force, went into Germany to examine the heavy German presses. The mission found several, the largest of which was a 30,000-ton press located at Bitterfeld, Germany. Bitterfeld was declared to be within the Russian zone, and the 30,000-ton press ultimately went to Russia. General Wolfe, who retired from the Air Force in 1951 and now serves as president of the Oerlikon Tool & Arms Corp. of America, told the committee that the United States acquired two 15,000-ton German presses together with some smaller and supporting presses.

General Wolfe stated that the Air Force urged the launching of a heavy-press program in this country as early as 1942. One press of 18,000-ton capacity was completed in 1946 and installed at the Wyman Gordon Co. in North Grafton, Mass. In 1948, General Wolfe said, he attempted to get the support of the aircraft industry and the Air Force to go ahead on a large press program but that the industry was not interested, largely because the airframe manufacturers were of the belief that their needs did not warrant the large expenditures necessary to build the presses.

Samuel W. Anderson, Deputy Administrator for Aluminum, Defense Production Administration, advised the committee that a program to build eight large forging presses and nine large extrusion presses had recently been authorized. He said the program called for two 50,000-ton, four 35,000-ton, and two 25,000-ton forging presses as well as nine extrusion presses ranging in size from 8,000 to 20,000 tons capacity. The first press should be ready for testing in late 1953 and the balance of the program is expected to be completed by late 1954 or early 1955. It is being sponsored and financed by the Air Force at a cost of approximately \$400,000,000. According to Mr. Anderson, the new presses will be of particular benefit to the production of aircraft in that they will make possible forgings which will greatly strengthen the character of the airplane. In addition, the use of large-size aluminum forgings—

will save a great deal in the way of man-hours, in metal, and in time, and will release an enormous amount of equipment * * * which is now being utilized to shape unforged or cast aluminum.

General Wolfe stated that he was a staunch advocate of a 75,000-ton press and that such a press was contemplated when he retired from the Air Force. He said he felt the current heavy-press program as outlined by Mr. Anderson was inadequate, and that heavier presses would soon be necessary. In summary General Wolfe testified—

I feel that you should buy the equipment not only to do today's job but also tomorrow's job that is in the program.

Mr. Anderson said he was inclined to agree with General Wolfe on this point but that today's program—

is so large in terms of its impact on the resources of this country in machining and construction that at the moment it probably would not greatly facilitate or greatly accelerate a larger program to technically enlarge it at this point.

General Metzger of the Air Force testified that the largest forging press now in operation in this country was the one at North Grafton, Mass. He stated that one of the 15,000-ton presses procured from Germany is now in operation at the Alcoa plant at Cleveland and that

another 15,000-ton German forging press is being installed at the Air Force plant in Adrian, Mich.

Army and Navy spokesmen were of the opinion that there was no need for presses larger than those now scheduled. General Christmas of the Army referred to "the tremendous cost of 50,000- and 75,000-ton presses, the requirements for unusual supplementary equipment, the possible vulnerability of such installation to destruction from air attack," and concluded that "current production requirements of the Army do not justify procurement of either a 75,000-ton or 60,000-ton press."

TESTIMONY OF MAJOR PRIME CONTRACTORS

Recognizing the interdependence of small and large concerns in the defense effort and realizing that delays in the delivery to major defense contractors delayed the letting of subcontracts to small concerns, the committee questioned representatives of General Electric, Pratt & Whitney, and Buick Motor Car Division of General Motors Corp. regarding the status of their defense contracts and the impact of machine-tool shortages. The accounts of their experiences in attempting to obtain machine tools paralleled to a surprising degree those of the small manufacturers heard earlier by the committee.

Representatives of the Pratt & Whitney Aircraft Division of the United Aircraft Corp., of East Hartford, Conn., stated that they were producing both jet and piston aircraft engines for the Air Force and the Navy. J. L. Bunce, factory manager for Pratt & Whitney, stated that the acceleration schedules first issued by the military in the summer of 1950 required Pratt & Whitney to double their production in 9 months and treble it in 15. A number of factors, including machine-tool shortages, made it impossible for the company to meet this requirement. Instead of 9 months it took the company 15 months to double its production, and they now expect to treble it in 24 months, namely by August 1952. Pratt & Whitney will then be producing at 60 percent of its World War II peak.

Referring to difficulties encountered by his company in its attempts to obtain machine tools, Mr. Bunce said:

Ever since the outbreak of the Korean war, practically all machine tools have been in very short supply, and delivery promises have been steadily lengthening. Many of the promises could not be relied upon; they kept extending them. And, depending on the character of the machines, they run anywhere from a year to 3-year deliveries, and when you come to specials, most of them are over 2 years.

Mr. Bunce stated that Pratt & Whitney had made diligent efforts to obtain machine tools from all sources. From the record:

We continually are searching reserves and have been ever since the summer of 1950. Actually about half the Government machines that we have received since Korea have come out of reserves, and we are continuing to search reserves as new requirements develop. We go out and search the second-hand markets, and of course we are in constant touch with the manufacturers making our machines; in other words, following them very closely. * * *

We went over to Europe last summer and searched the Continent, and we actually have something like 87 machines on order from Germany and Switzerland.

In spite of these efforts Pratt & Whitney was still in dire need of machine tools as of the first quarter of 1952. Mr. Bunce furnished the following table indicating the status of Pratt & Whitney's machine-tool requirements:

1952

	First quarter	Second quarter	Third quarter	Fourth quarter	Total 1952
Required	547	365	284	111	1,307
Promised	288	318	326	185	1,117

1953

	First quarter	Second quarter	Third quarter	Fourth quarter	Unsched- uled
Required	12				
Promised	79	32	28	10	53

Mr. Bunce furnished to the committee statistics which indicated very graphically the extent to which Pratt & Whitney depends upon small manufacturing concerns in its operations. He stated that his company normally subcontracts about half of the work on an aircraft engine. Pratt & Whitney now has 5,265 suppliers located in 34 States. Ninety percent of these are small businesses and they receive 70 percent of the dollar value of all subcontracts. In 1951 Pratt & Whitney paid out \$210,000,000 to small suppliers.

In the opinion of the Pratt & Whitney representatives, the lack of an adequate priority system is probably as great a deterrent to increased production as the machine-tool shortage. They stated that the priority system in effect in World War II was much more effective than the present one. Mr. Bunce stated that the current priority system "requires some clarification." He pointed out that Pratt & Whitney is currently producing the J-48 jet engine, a "brickbat" item. "Yet we go out and visit our machine-tool friends and they never heard of it." He also referred to difficulties in trying to complete a new plant for Pratt & Whitney at North Haven, Conn. He said that the plant will be 3 or 4 months late due to difficulties in obtaining steel, switch gear, and copper.

The confusion and frustration confronting manufacturers trying to obtain machine tools to produce military items outside the "brickbat" category was demonstrated in the testimony of spokesmen of the Buick Motor Car Division of General Motors Corp. They stated that their company was working on two vital defense contracts, the CD-850 cross-drive transmission for tanks and the J-65 Sapphire jet engine. Edward T. Ragsdale, general manufacturing manager for Buick, stated that the company was already producing on its CD-850 contract but that due to machine-tool shortages, it was not going to be able to meet the accelerated production called for in its schedule. He stated that to date the company has had to improvise and produce parts in its own tool shop in order to fill its needs. According to Mr. Ragsdale, the company needs a total of 2,859 machine tools to go into full production on the CD-850. As of March 17 they had received 1,988, leaving a total of 871 machine tools undelivered. The company needed 986 machine tools in order to set up its pilot line. Theoretically, a pilot line consists of one tool of each type required to go into production on an item. Buick received promises

in August 1951 that all 986 tools for the pilot line would be delivered before May 1, 1952. As of March 17 the company had received 723, leaving a total of 243 undelivered. Of this number, 89 would not be delivered by May 1, the delivery dates on some of them having been pushed back to as late as 1954. Mr. Ragsdale attributed the changes in delivery promises to the overriding priorities held by other defense contractors. Roger Mitchell, general master mechanic for Buick, stated that his company held a DOU-9 priority for machine-tool purchases. He described the priority as "just a hunting license." He said, "We get some game and the other fellows take it away from us."

The situation was the same on the J-65 Sapphire jet engine. The company had to start building its first three test engines by May 1, 1952, and had to go into production in the last quarter of the year. A total of 7,296 machine tools was required for full production. As of March 17, 1952, Buick had received 1,140, leaving 6,156 to be delivered. It needed 1,984 tools for its pilot line. Only 507 had been delivered, leaving 1,477 yet to come. The best promises Buick could get for delivery on these pilot-line machine tools ran into the first half of 1954. On some of them they were unable to get any firm delivery date. Mr. Ragsdale stated that some adjustment in its needs could be made through use of its own toolroom and through various types of improvisation, but that the irreducible minimum of additional tools required for the pilot line on the J-65 was 125. He stated that Buick had been unable to get satisfactory delivery dates even on this number of tools, promised dates again running into 1954. In some instances no delivery promises could be obtained from the machine-tool builders on these minimum requirements.

H. W. Chandler, manager of operations for the Aircraft Gas Turbine Division, General Electric Co., Lockland, Ohio, stated that the Lockland plant was producing the J-47 jet engine, a "brickbat" item, as well as the J-73 jet engine. He stated that General Electric subcontracts about 75 percent of its jet-engine program and has about 25 major subcontractors. The total of lower tier subcontractors and suppliers numbers over 40,000. They are located in 41 different States. According to Mr. Chandler, 80 percent of these are small businesses.

Mr. Chandler stated that the jet engines being produced by General Electric are going into the F-86 Sabrejet fighter and the B-47 bomber. He said that General Electric is currently producing these engines at about 25 percent of the maximum contemplated schedule and that machine-tool shortages are already creating problems among several of the subcontractors. He testified that in some instances promises on machine-tool deliveries are running from 4 to 7 months behind General Electric requirements, and that maximum production, now scheduled for the second quarter of 1953, will not be met unless machine-tool deliveries improve. In describing the efforts of General Electric to meet machine-tool requirements, Mr. Chandler stated:

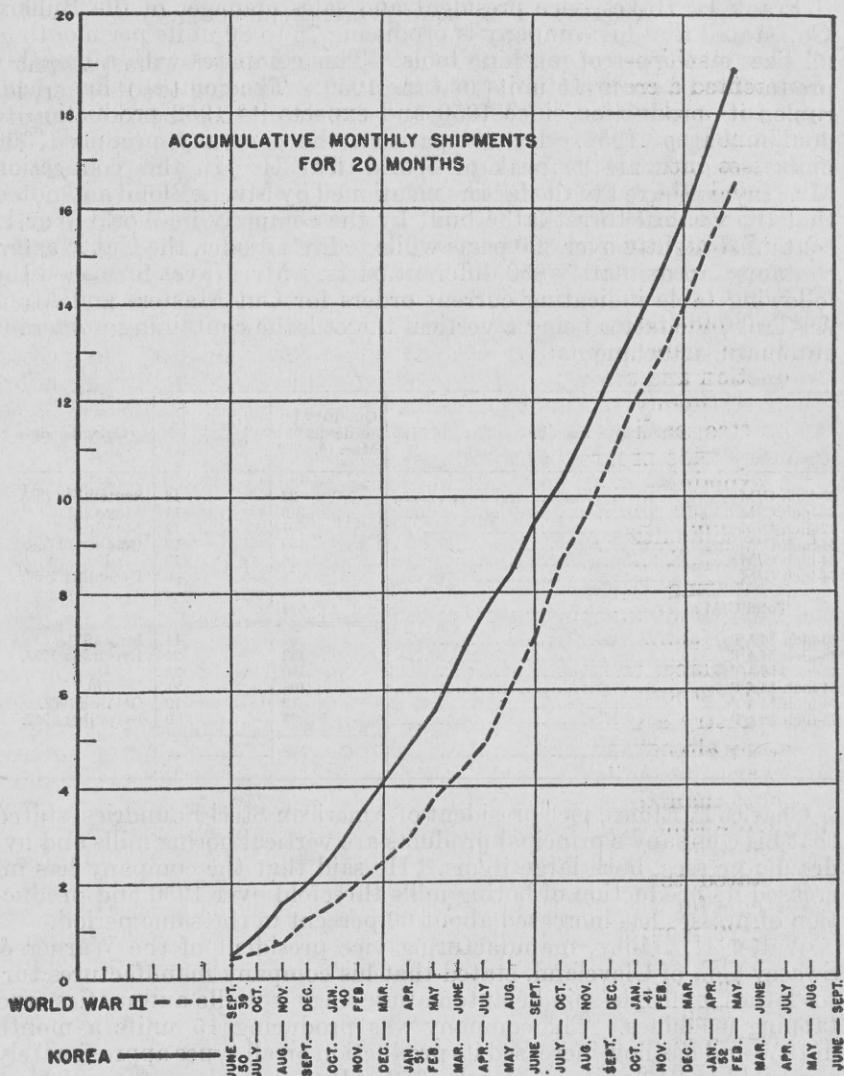
We have made a number of substitutions, and have, of course, screened the reserves and purchased tools in Europe, and have reduced a number of the machine-tool requirements by readjusting our subcontract structure, and have purchased tools in the used-tool market where they have been available.

TESTIMONY OF MACHINE-TOOL BUILDERS

The machine-tool builders who appeared before the committee represented a cross section of the industry producing the most critical types of machine tools. Their products were those most frequently mentioned by the previous witnesses as being in short supply. The witnesses included representatives of the Warner & Swasey Co. of Cleveland, the R. K. LeBlond Machine Tool Co. of Cincinnati, the Bullard Co. of Bridgeport, Conn., and the King Machine Tool Division of American Steel Foundries, Inc., Cincinnati. Representatives of these companies were questioned specifically concerning their attempts to increase production and the current status of their backlogs of undelivered machine tools. Almost without exception they produced data indicating diligent effort on their part to increase production and statistics showing commendable success in this effort. Their testimony tended to confirm the information furnished to the committee earlier by Swan Bergstrom of NPA, with respect to industry-wide progress on production.

In explaining why the rate of production has not increased even more sharply since Korea the machine-tool builders referred to the various difficulties previously mentioned by Mr. Bergstrom, particularly the lack of priorities and the inadequate pricing regulations. In comparing World War II and post-Korea production figures on the number of machine tools produced they pointed out that there were two factors which rendered such a comparison unrealistic. In the first place, they said, the industry was off to a running start as of Pearl Harbor. The war in Europe had given the American machine-tool industry a tremendous increase in orders starting in 1939, and it was thus already producing at a high rate when this country entered the war. Secondly, today's machine tools are considerably more complex than their World War II counterparts and require a great deal more time and labor to produce.

Richard L. LeBlond, president of the R. K. LeBlond Machine Tool Co., stated that a comparison of the dollar value on machine-tool shipments for the 20 months following September 1939 with the figures for the 20 months following Korea would present a truer picture of the success of the machine-tool builder in increasing his production during the current emergency. The accompanying chart presents such a comparison for the LeBlond Co. and indicates that the rate of increase in production for that company since Korea exceeds the rate achieved in the comparable period following September 1939.



Frank U. Hayes, vice president and sales manager of the Bullard Co., stated that his company is producing 75 to 80 units per month of all sizes and types of machine tools. This compares with a monthly production of about 15 units in June 1950. The company has quadrupled its production since 1950 and expects its 1952 production to double that of 1951. By comparison, the company produced 300 units a month at the peak of World War II. In this connection Mr. Hayes referred to the factors mentioned by Mr. LeBlond and noted that the vertical turret lathe built by the company in World War II contained slightly over 300 parts while today's model, the Cut Master, contains approximately 850 different parts. Mr. Hayes furnished the following table indicating current orders for Cut Masters and Man-Au-Trols, the latter being a vertical turret lathe containing numerous automatic attachments:

Size and type machine	Quantity on order as of Mar. 15, 1952	Months to complete	Calendar date
30-inch C/M.....	37	18	September 1953.
36-inch C/M.....	240	14	May 1953.
42-inch C/M.....	197	12	March 1953.
54-inch C/M.....	130	19	October 1953.
64-inch C/M.....	16	19	Do.
74-inch C/M.....	4	9	December 1952.
Total C/M's.....	624		
30-inch MAT.....	97	14	May 1953.
36-inch MAT.....	133	21	December 1953.
42-inch MAT.....	190	21	Do.
54-inch MAT.....	163	21	Do.
64-inch MAT.....	12	19	October 1953.
74-inch MAT.....	3	9	December 1952.
Total MAT's.....	598		

Charles F. Elmes, vice president of American Steel Foundries, stated that his company's principal products are vertical boring mills and hydraulic presses, both large items. He said that the company has increased its production of boring mills threefold over 1950 and production of presses has increased about 60 percent in the same period.

Walter K. Bailey, manufacturing vice president of the Warner & Swasey Co., of Cleveland, stated that his company manufactures turret lathes, multiple-spindle automatics, single-spindle automatics, and tapping machines. The company was producing 15 units a month in 1950 and has now increased its production on all types approximately sevenfold to 213 units in March 1952. By comparison, the company went from 80 machines a month in 1939 to 300 a month in the middle of 1941. Its peak World War II production of 750 units a month was achieved in the middle of 1943 while the company was operating another plant. The company now has 2,982 machine tools on order and estimates that it will take 15 months to complete deliveries on these units.

Manpower problems have played a part in delaying greater increases in production. Unlike the post-1939 period, the industry had difficulty in recruiting skilled manpower after Korea. Mr. Bailey stated that Warner & Swasey hired nearly 1,000 people in the last half of 1950 but that over-all efficiency dropped in the ratio of 90 to 57. He pointed out that the company had only 600 production workers in

June 1950 and that this number was insufficient to train the new employees. The turn-over of personnel also creates problems. Mr. Hayes of the Bullard Co. presented the following table indicating the employment experience of his company since January 1951.

Employment turn-over record, by months, period Dec. 31, 1950, through Feb. 29, 1952

Month	Total active employees	Number hired	Number terminated
1951-January	2,289	260	63
February	2,523	265	68
March	2,773	289	92
April	2,919	290	132
May	3,026	232	122
June	3,118	206	130
July	3,150	136	97
August	3,190	175	142
September	3,236	194	148
October	3,275	151	107
November	3,413	243	110
December	3,446	108	75
1952-January	3,538	191	99
February	3,560	131	88

The committee devoted considerable attention to the subcontracting operations of the machine-tool builders. It was the view of the committee that subcontracting presented the best possibility for increasing machine-tool production and that an increase in subcontracting activities would also favor the numerous small manufacturing concerns seeking the assistance of your committee in obtaining work. The machine-tool builders pointed out that due to the close tolerances and extreme precision required in the manufacture of their products they were limited to a certain degree in the amount of work which could be subcontracted. They noted, however, that they had made extensive efforts to employ subcontractors and had in fact done so to a greater extent since Korea than they did in World War II. This information tended to contradict previous reports to the effect that the machine-tool builders were not taking full advantage of subcontracting opportunities.

One particular subcontract excited the concern of your committee. In January 1951 the Air Force reportedly expressed a need for a large quantity of vertical turret lathes. These lathes were to be used by Air Force contractors. Negotiations were begun between the Air Force, the Bullard Co., and the Fisher Body Division of the General Motors Corp. whereby Fisher Body was to build these lathes as subcontractors, under a pool order contract to be let by the Air Force to the Bullard Co. Reports coming to your committee reflected that there was considerable delay on the part of all parties in coming to terms on the contract. In September 1951 a letter contract was awarded to the Bullard Co. by the General Services Administration. By the terms of the agreement, Bullard was to sublet the total requirement for the building of 757 42-inch Bullard Cut Master vertical turret lathes to Fisher Body. Bullard was to sell and service the units. The price of the first units was to be approximately \$90,000. This amount included a charge of about \$14,000 for the Bullard Co., the same amount they received in profit and manufacturing expense on units manufactured in their own plant and sold for approximately \$38,000.

In November 1951, according to the same sources, the Bullard Co. told the Air Force and the National Production Authority that they could not find any contractors who wanted to buy the Fisher-built lathes. Finally, in February 1952, when Fisher was within a few weeks of delivering the first unit, the contract was canceled.

The allegation was that the Bullard Co. was reluctant to subcontract to Fisher for fear that it might be fostering the birth of a major competitor in the production of vertical turret lathes. Bullard therefore, so the reports went, did everything in its power to discourage the letting of the contract to Fisher, and after the award of the letter contract Bullard reportedly made only half-hearted attempts to sell the Fisher-built units. It was also alleged that Bullard added its \$14,000 "profit" margin to the Fisher cost of manufacture in order to inflate the price and further discourage prospective purchasers.

Testimony of witnesses on their difficulties in obtaining vertical turret lathes lent some credence to the reports regarding the delays in the negotiation of the Bullard-Fisher contract. The committee found it difficult to understand why the contract had been canceled in the face of the continuing demand for Bullard units. Swan Bergstrom of NPA said that the contract had been canceled on the recommendation of the Munitions Board. He stated that a reexamination of Air Force requirements for this particular type of machine tool disclosed that the demand had been dissipated through substitution of other types of units and by cut-backs in Air Force airplane production schedules. Mr. Bergstrom emphasized the fact that the letter contract called for 757 units of one special type of machine, namely, the 42-inch Bullard Cut Master vertical turret lathe. He stated that the demand for this unit as of January 1952 simply did not warrant the expenditure of further funds for execution of the Bullard-Fisher contract and that it was canceled for that reason alone.

Air Force representatives corroborated Mr. Bergstrom's testimony concerning the cut-back in Air Force requirements for the 42-inch Cut Master. They stated that they had not detected any reluctance or any delaying tactics on the part of the Bullard Co. during negotiations leading up to the award of the letter contract. They stated that delays up until August 1951 were attributable principally to the problem of agreeing on a price for the Fisher-built units. It was not until August 1951 that OPS opened the way for a satisfactory agreement on this point, and the letter contract was awarded shortly thereafter.

It was noted that Roswell Gilpatric, Under Secretary of the Air Force, wrote to NPA on September 12, 1951, with regard to the Air Force need for these units. In his letter he commented on the estimated price of the units, namely \$90,000, and stated, "Nevertheless the aircraft-production program is in such need of this type of machine that I recommend to you that you complete the negotiations with Fisher Body Division irrespective of the price factors as the Air Force will be in a position under present planning to take all of this type of machine that can be produced in the months ahead." Scarcely 2 months later, on November 15, 1951, Frank Hayes of Bullard wrote to NPA stating that his company had been unable to find contractors who would need the Fisher-built machines. The reexamination of Air Force requirements which was prompted by Mr. Hayes' correspondence confirmed the fact that the requirements had been dissipated:

The committee found it hard to believe that such could be the case, and yet the Air Force representatives conceded this to be a fact.

The letter contract was financed at \$10,000,000. As of February 6, 1952, when the contract was canceled it was not known how much of this amount might be salvaged by the Government. It occurred to the committee that this was a case of extremely poor and wasteful administration on the part of the Air Force. Had that agency been alert to its responsibilities it should have been better informed on its own needs for vertical turret lathes. It should not have been necessary to launch a \$10,000,000 program and then have to depend on Mr. Hayes to advise it of its gross miscalculations.

Harold R. Boyer of DPA was of the opinion that the Bullard-Fisher contract should not have been canceled. Mr. Gilpatric was not sure himself that the decision was sound. He said:

I would be the last one to say in the light of hindsight a year or two hence that the decision will not be viewed as erroneous * * *. It was one of those decisions that could well turn out to have been wrong.

Mr. Hayes reviewed the history of the Bullard-Fisher contract in detail in his testimony before the committee. He stated that actually the negotiations were in two parts; that the Air Force commenced negotiations in January 1951 and then concluded them in July 1951. The matter was reopened in August 1951 and led to the issuance of the letter of intent in September 1951. Mr. Hayes denied that he or the Bullard Co. were reluctant to complete the negotiations. He stated that the price on the units was in agreement with OPS regulations. He said that in accordance with those regulations Bullard added \$15,304 to Fisher's manufacturing cost in arriving at the sale price of the units, \$90,608. Mr. Hayes furnished the following data with regard to the breakdown on the \$15,304 amount:

Estimated cost for time and expense of Bullard personnel at Fisher plant and added engineering and supervisory work at Bullard plant on this subcontract	\$400. 00
Main drive motor and starter	946. 00
Estimated selling and installation expense (entire responsibility for selling the machines was ours)	1, 203. 72
Parts to be furnished to Fisher at no charge by Bullard	182. 54
General administration expense	803. 81
Estimated reserve for service and guaranty	400. 00
Estimated reserve for dealer discount on sales in territories serviced by our established dealers	2, 009. 52
Engineering and preproduction expense	440. 00
Estimated profit before renegotiation and taxes	8, 918. 41
Total	15, 304. 00

In addition Mr. Hayes noted that the \$15,304 factor was computed before taxes and renegotiation. He stated that under the terms of the GSA letter contract, Bullard was to store the machines for GSA if Bullard was unable to locate purchasers. In that event Bullard was to receive only 82.5 percent of the \$90,608 price, which would yield Bullard \$3,978 for its work.

Mr. Hayes charged that the Air Force "terminated the contract for the convenience of the Government simply because they were in such a state of confusion, due to the inability to untangle the specifications and the allocations to different contractors."

The committee sought the suggestions of all witnesses for improvement in the production of machine tools. The machine-tool builders were unanimous in suggesting that the Government not repeat, when the mobilization period ends, its action after World War II, when it flooded the machine-tool market with surplus tools at a fraction of their cost. They stated that this move deprived the machine-tool industry of its normal market for several years and forced it into a grave depression which made it extremely difficult for the industry to rise to the demands made upon it after Korea. They were also unanimous in their demand for improved priorities on machine-tool deliveries. On this point Frank Hayes said:

The sequence of shipment which is to be followed is a problem which has not yet been solved so far as we are concerned. In our opinion, this can be solved only through the use of a general preference system which would automatically establish urgency of contracts, thereby making it possible to determine which contractor should receive machines of identical description in preference to others. This kind of preference system was used very effectively during World War II.

It is our belief that the use of such a relative urgency system would alleviate the machine-tool situation to a great extent, not by reducing the numbers of machines required, but by controlling the distribution in keeping with actual requirements.

Some of the spokesmen for the machine-tool builders expressed concern over their dwindling exports. They pointed out that in normal times they export about 20 percent of their production but that now only 10 percent is going overseas. They also noted the emergence of a thriving machine-tool industry in Europe and stated that some foreign tool-builders are underselling American producers in this country because of their lower labor costs.²

One major complaint of the machine-tool builders related to the cut-backs in military programs. They stated that these cut-backs have resulted in substantial cancellations of machine-tool orders and have led the machine-tool builders to the belief that the demand for their products may already be coming to an end. Frank Hayes referred to cancellations received recently by the Bullard Co. and stated—

* * * it is quite evident that the changes made to both ordnance and aircraft programs has resulted in a noticeable reduction in requirements for equipment of our manufacture. While we appreciate that such changes in requirements may not be avoidable, nevertheless, they have contributed a degree of instability in our planning and operations. In fact, it causes us to wonder whether or not the machine-tool requirements will finally result in an even lesser total than currently exists.

Richard E. LeBlond referred to the same matter in the following words:

I think the trouble with Korea is that there was not any plan laid out right away as to what they were going to do. The plan has been growing like Topsy and every month it is something different, and if you continue to do that, the machine-tool industry never will catch up.

The machine-tool builders asked for some action that would end or at least relieve the "feast and famine" cycle in the industry. They pointed out that the industry could have made a far better start after Korea had its members been in sounder condition financially and productionwise. They noted, however, that Korea found the industry in one of its historic "famine" periods. Suggestions to achieve this result varied widely. Richard E. LeBlond was of the opinion that the

² See appendix, p. 45, for statistics on 1951 machine-tool exports.

industry could take care of itself between wars if the Government would simply refrain from dumping surplus tools on the market at sacrifice prices. He stated that such competition was "just out of the question."

L. D. McDonald, of the Warner & Swasey Co., submitted one of the most provocative suggestions for stabilizing the industry. He suggested that purchasers of machine tools be allowed to write off the cost of their equipment for tax purposes over a period of time to be selected by the taxpayer. He noted that Treasury Decision 4422, issued by the Treasury Department in 1934, and Bulletin F of the Bureau of Internal Revenue, revised in January 1942, arbitrarily fix the life of a machine tool in such a way as to have the effect of "strangling modernization and perpetuating obsolescence." Bulletin F says that a turret lathe has a life of 25 years and a milling machine a life of 20 years. Although the regulations state that these periods are set forth merely as guides, Mr. McDonald contends that "the arbitrary lives controlled because of the impossible burden of proof placed on the taxpayer under Treasury Decision 4422."

Mr. McDonald pointed out that some foreign countries, notably Sweden and Switzerland, allow the individual manufacturer to fix his own rate of tax-free recovery and noted that as a result those countries have modern industries. He stated that the granting of similar privileges to American manufacturers would encourage them to keep their equipment modernized. That, he said, would result in eliminating much of the reconversion required in a defense effort. It would also result in a continuing demand for the products of the machine-tool industry. With respect to the possible effect of such an arrangement on the Federal revenues, Mr. McDonald conceded that there would be a short-term loss but that the long-term net effect would be nil. He pointed out that once a machine tool was completely depreciated the owner would not thereafter be entitled to amortization deductions and thus would be paying increased taxes.

PART II—CONCLUSIONS AND RECOMMENDATIONS

Machine-tool shortages have caused incalculable harm to small manufacturing concerns. The shortages have prevented many of them from undertaking defense contracts which they needed in order to survive the cut-backs in civilian production. The same shortages have affected large manufacturing concerns alike, preventing them from getting into full production, and thus making it impossible for the large contractors to subcontract to smaller industries. Above all, the shortage of machine tools has seriously retarded the building of our armed strength at a time when a maximum force at the earliest possible moment is imperative to our safety and perhaps to our survival.

The committee cannot escape the conclusion that machine-tool shortages were avoidable and that they were the result of inexcusable shortsightedness and gross mismanagement of the machine-tool program at the outset. The experiences of World War II, when American industry went through similar difficulties, should have taught us the importance of the machine-tool industry in any defense program and the need for giving that industry every assistance in its efforts to expedite production. Yet the first Administrator of this

mobilization period, later replaced, failed to sense the overriding importance of a swift expansion in our machine-tool resources.

In retrospect, one of the gravest errors of the past decade, insofar as American industry is concerned, and one in which many must share the blame, was the program to liquidate surplus machine tools after World War II. The almost promiscuous abandon with which they were distributed should have warned responsible officials of the dangers inherent in such a program. It should have been apparent that the flooding of the country with machine tools at 20 cents on the dollar and the loading of real and pseudoeducational institutions with expensive high-production equipment at 5 cents and less on the dollar would dry up the machine-tool market for years to come. No industry could be expected to survive such competition. The machine-tool industry was plunged into the depths of a depression as a result. Then it was expected to race into high gear again at Korea.

In the opinion of your committee the delay from Korea until August 1951 in extending price relief and priority assistance to the machine-tool builders was a major error. Members of the industry came to Washington in September 1950 to seek the assistance they so obviously needed, without result.

The failure of the Department of Defense to produce a master preference list on defense contracts until January 1952, more than 18 months after Korea, is a classic example of nonfeasance. In the words of the chairman of the subcommittee, the need for such a list "should have been obvious about the 28th of June 1950." One gratifying development following the conclusion of the committee's hearings on machine-tool shortages was the publication on April 18 of a numerical preference list to govern the priority of machine-tool deliveries to defense contractors. The committee had repeatedly urged the issuance of such a list, feeling that it would go far to break many defense production bottlenecks. This should now insure the more orderly delivery of machine tools and should eliminate to a great degree the frequent reshuffling of the order boards of the machine-tool builders, with resultant disappointments and confusion among defense contractors.

The Department of Defense must bear a share of the blame for dereliction in other areas of the machine-tool program. It is the judgment of this committee that cut-backs and changes in defense production schedules have caused considerable uncertainty and dislocation not only in the machine-tool industry but in industry generally. The wisdom of the cut-backs in military schedules, which delay the hour of our maximum strength and extend the period of our vulnerability, is a question of policy not immediately before this committee. But it is clear that improved planning and decreased shifting of schedules would stabilize production and should result in earlier attainment of production goals.

The neglect of process engineering during the years between World War II and Korea has undoubtedly complicated the machine-tool problem. It is regrettable that this occurred. The Department of Defense should place special emphasis on process engineering on all future programs for the development of major military weapons. A study of the machine tool needs on an item concurrently with its development is an obvious necessity. It should enable machine-tool

builders to anticipate requirements and thus avoid delay in production after contracts have been let.

Our experience in World II, backed now by our experience since Korea, should impress upon all concerned the absolute necessity for progressive and aggressive action with respect to machine-tool problems.

First and foremost among these problems is the need for a program to stabilize the machine-tool industry. In the words of Harold R. Boyer,

The machine-tool industry is the heart and soul of any defense program, and as the types of weapons, planes, guns and everything that we build become more and more complicated, that becomes more and more true. * * *

Machine tools are just as much a material of war as an airplane engine, in fact more important because without them you can't make the engine.

It is often said, and rightly so, that the machine tool business is a "feast and famine" business. It goes through peaks and valleys of demand for its products. If the industry is to be stabilized, the peaks and valleys must be smoothed out.

America was fortunate in that the Korean incident did not flare into an all-out war at an early date. Korea found the machine-tool industry in the "famine" phase of its cycle. We have had 2 years in which to nurture the industry back to health. America may not be able to avail herself of a like period of grace when the next emergency breaks over us. Action must be taken now to insure the stability and continuing vigor of the machine-tool industry.

As a first step in that direction the committee feels it imperative that responsible Government officials resolve now not to allow the broadcasting of surplus machine tools at sacrifice prices upon the conclusion of the current emergency. The committee recommends that surplus machine tools be stockpiled so that the country will never again be caught short in a period of acute national need. Such a step will guarantee the industry the normal market it must have if it is to thrive in peacetime.

The committee also recommends consideration of the suggestion for an amendment to the Internal Revenue Code and changes in the regulations governing tax amortization of capital equipment. Sponsors contend that such a provision would encourage the replacement of obsolete and inefficient capital goods, accelerating the modernization of American industry. It would also insure a live market for the products of the machine-tool industry, thus contributing to the health and vigor which is essential to that industry if it is to be ready to roll in time of emergency.

Consideration should also be given to the implementation of the Production Acceleration Insurance Program. The program would establish "stand-by" plants, fully tooled and equipped in readiness for defense emergencies.

The committee was impressed with the progress of the joint NPA-FSA-Department of Defense program to recover surplus machine tools from educational institutions. This program would obviously result in considerable direct and immediate benefit to small manufacturing concerns. The effectiveness of the program to date was evidenced in the many complimentary reports reaching your committee from small manufacturers who had already availed themselves of its benefits. The committee considers it unfortunate that FSA is

restricted by too stringent budgetary limitations. In the opinion of your committee, this program should have wholehearted support, with adequate funds. Every effort should be exerted to insure maximum recovery of surplus machine tools in the shortest possible time. This could be real economy.

While the committee recognizes the limitations on subcontracting by machine-tool builders, still it feels that this avenue to increased production should not be closed. Members of the industry should be continually on the alert to opportunities to sublet either portions of their work or entire units when that is feasible.

On the basis of the testimony taken at its hearings on machine-tool shortages, the Select Committee on Small Business is of the opinion that the basic problems on machine tools were recognized belatedly but that proper steps are now being taken to meet the problems. Thanks to some leaders of the industry and to the work of men like Harold R. Boyer of DPA and Swan Bergstrom and Jack Woll of NPA, the machine-tool shortage is being liquidated and the industry now appears to be over the hump. In March, for the first time since Korea, machine tool deliveries exceeded the number of new orders received. And in May, machine-tool shipments ran 13 percent ahead of new orders, the highest ratio in 10 years. At that rate machine-tool builders expected to complete their backlog in 13½ months as against 23½ months at the September 1951 rate of production. The remaining bottlenecks should be broken by the end of 1952.

A major development following the conclusion of the committee's hearings was the creation of the Advisory Committee on Production Equipment (ACPE). The new group has the responsibility for planning long-range production of machine tools for defense. ACPE might well make its first order of business the consideration of this committee's recommendations looking toward the stabilization of the machine tool industry.

The dependence of small manufacturing concerns on a healthy and productive machine tool industry is readily apparent. The welfare of the machine-tool builders and small manufacturing concerns go hand in hand. Prompt action to alleviate the chronic problems of the machine-tool industry is necessary if small manufacturing concerns are to avert the effects of machine-tool shortages in the future

APPENDIX

The following table, based on statistics compiled by the Bureau of the Census, reflects available data on 1951 exports of American-made machine tools.

Countries	Lathes							Mills, boring and turning vertical	Precision boring machine, jig boring and grinding	Tapping and threading machines	Screw machine, automatic single and multi- spindle
	Engine, tool room	Bench and light type	Vertical turret	Turret, ram and saddle type	Automatic checking and between center	Speed, polishing, buffing and burnishing	Except artillery and am- munition				
Canada.....	\$630,136	\$182,542	\$1,869,357	\$273,791	\$996,036	\$151,511	\$53,559	\$574,471	\$486,226	\$544,383	\$363,968
Mexico.....	405,178	86,945	90,098	101,845	13,929	12,013	83,326	12,305	4,658	144,899	4,575
Guatemala.....	13,184	1,679				1,835					
Salvador.....	3,414	3,330							3,300	4,570	
Honduras.....	2,544									3,266	
Nicaragua.....	5,440					2,953					
Costa Rica.....	7,720	6,476									
Panama.....	13,873									1,190	
Canal Zone.....	11,078	1,210									
Cuba.....	68,642	13,226				4,848	23,786			9,308	
Jamaica.....	26,233									4,546	
Dominican Republic.....	31,536				1,500	4,485				11,999	
North Antilles.....	8,697	1,861									
Columbia.....	268,222	23,691	1,162		4,100	12,912	8,148			31,328	
Venezuela.....	19,266	8,955			2,500	13,121	3,234	11,668	1,470	25,194	
British Guiana.....	9,750										
Surinam.....	6,870					2,209					
Ecuador.....	21,063	5,220		12,506	4,850	1,099					
Peru.....	49,452	16,907				3,349	1,470			13,247	
Bolivia.....	23,382	2,702								1,876	
Chile.....	35,176	26,516		4,357		3,630	6,986			16,324	
Brazil.....	277,824	55,099	11,375	79,847	75,034	24,810	33,005	61,134	35,265	168,063	
Paraguay.....	4,949										
Uruguay.....	53,177	29,403		10,726		1,763	12,209		2,166	3,488	
Argentina.....	28,048		8,150		33,980	6,156	7,529		27,299	35,230	14,610
Sweden.....	36,857	1,476		123,970	171,537				4,157	25,553	51,587
Norway.....	25,871	5,908			35,145	3,315				35,041	
Denmark.....	33,136					2,735			13,627	1,391	
United Kingdom.....	1,987,149	20,457	387,575	232,346	1,056,673	139,012	86,958	451,077	783,643	229,827	2,625,636
Ireland.....	1,774	2,324									
Netherlands.....	15,307					2,725				26,045	174,675
Belgium.....	13,544	11,024			18,568	5,592				14,267	36,951
France.....	226,638	5,666	229,300	139,941	1,783,017	28,741	11,373	231,922	277,364	270,879	953,556

Countries	Lathes							Mills, boring and turning vertical	Precision boring machine, jig boring and grinding	Tapping and threading machines	Screw machine, automatic single and multi- spindle
	Engine, tool room	Bench and light type	Vertical turret	Turret, ram and saddle type	Automatic checking and between center	Speed, polishing, buffing and burnishing	Except artillery and am- munition				
Austria	\$5,034	\$7,594		\$48,456	\$11,536						\$42,339
Switzerland	2,135	8,960		33,543		\$1,111			\$21,067	\$3,290	12,002
Spain	79,032								17,224	26,307	
Portugal	8,092	1,222									
Malta	24,122										
Italy	32,352	1,753	\$43,924	85,949	1,427,768				444,247	275,875	901,379
Trieste	149,900			87,366							
Greece	19,775	6,786				2,945				12,682	
Turkey	2,736	1,686			6,038				22,647	1,545	
Syria	3,884	1,254									
Lebanon	2,271	4,960									
Israel	175,599	18,337	1,450	25,425	23,474	3,403	\$4,164	\$17,200	10,620	53,061	20,193
Saudi Arabia	58,103				1,950				1,700	18,052	
India	20,066					3,756				9,782	21,895
Pakistan	4,021	7,544									
Ceylon	6,381										
Siam	2,917	18,180									
British Malaya	6,171					8,044					
Indonesia	178,572	5,431								7,328	
Philippine Republic	22,302	14,309			6,586	3,865	2,900			3,599	
Japan	1,290									22,453	
Australia	23,215	1,837			110,876	25,008			13,369	45,972	140,786
New Zealand	13,429	9,172			20,900				3,166	39,384	
French Pacific Islands	2,638	23,402									
French Morocco	5,617	8,067					2,795				
Tangier	2,190										
Ethiopia	2,800										
Union of South Africa	1,237	24,872		24,429				7,230	1,516	33,291	
Countries under \$1,000	435	7,414		905	1,485	2,579	5,300		2,367	5,017	
Haiti		1,825									
Angola		2,655									
Germany				64,840	91,881	1,586			4,535	146,092	
Iran							6,655				
Southern Rhodesia									1,375	3,374	
Belgian Congo										7,609	
Burma											
Yugoslavia											
Taiwan											
Trinidad											

UNCLASSIFIED

Finland.....											
Bermuda.....											
Bahrein.....											
Egypt.....											
Bahamas.....											
Tunisia.....											
Gold Coast.....											
Nigeria.....											
Mozambique.....											
Afghan.....											
Sudan.....											
French West Africa.....											
British East Africa.....											
Total.....	5, 221, 446	689, 877	2, 642, 391	1, 350, 242	5, 899, 363	484, 111	353, 403	1, 367, 007	2, 183, 008	2, 336, 627	5, 364, 152

MACHINE-TOOL SHORTAGES

Countries	Milling machine, knee and column type	Milling machine	Gear cutting machine	Drilling machines, sensitive upright and gang	Drilling machines, radial	Drilling machines	Planers, metal, power-driven	Shapers, metal, power-driven except gear shapers	Grinding machines		
									Surface	External	Internal
Canada	\$648,364	\$907,946	\$741,946	\$118,710	\$70,092	\$431,777	\$371,921	\$98,427	\$510,593	\$266,685	\$442,566
Mexico	68,353	28,533	11,887	42,958	85,352	53,026	56,238	96,682	45,381		11,150
Guatemala	3,743					1,400		5,750			
Salvador			2,550	4,062		1,045	3,564				
Honduras	3,221			1,715							
Nicaragua											
Costa Rica	2,418			1,182							
Panama											
Canal Zone							34,745				
Cuba	5,031	20,387		9,096	12,325	7,442	1,442	5,878	1,308		
Jamaica						2,919					
Dominican Republic				2,381				4,901			
North Antilles		8,685									
Colombia	5,780	25,251	12,201	11,702	7,221	4,565	6,954	23,085	35,623		
Venezuela		10,188	4,565	8,108	35,226	4,999	5,789	11,596	4,035		
British Guiana											
Surinam											
Ecuador							1,494	4,125			
Peru		22,291		7,239	3,830	3,992		7,918			
Bolivia						1,521			1,663		
Chile				8,632		2,300		1,538			
Brazil	213,437	296,857	113,239	70,727	42,416	62,767	16,797	61,477	122,574	20,511	2,610
Paraguay				1,014							
Uruguay	7,381			1,751		2,386			2,931		
Argentina	22,888		6,482	36,857		1,800		1,762	13,364		18,551
Sweden	7,521	70,344	141,966		1,182	44,926			29,496	35,434	
Norway	7,218	21,272				2,787			3,525		5,066
Denmark		34,365				3,750			4,974	9,950	
United Kingdom	446,947	1,220,954	1,758,062	20,060	15,173	729,141	47,650	217,289	654,840	1,038,327	842,957
Ireland		4,098									
Netherlands	25,258	68,581		15,528	11,245	35,317		45,675	30,485	73,481	
Belgium	68,306	92,802	6,389			2,048	27,391	53,336	42,721	14,998	43,974
France	176,683	1,071,012	1,125,774	4,510	33,185	99,994	346,525	7,300	303,006	691,165	477,282
Austria	41,228	9,317				8,790		6,218	17,089	93,974	
Switzerland	111,329	40,924	9,028	9,823		3,759			27,648		17,225
Spain	4,022	13,180	17,547						2,448		63,140
Portugal						2,610				61,306	
Malta											
Italy	53,489	1,335,721	625,594		22,264	221,797	9,281		156,310	456,279	268,999
Trieste									9,424	16,692	

Greece						1,444				18,000	
Turkey		15,115				38,844			8,687		
Syria											
Lebanon											
Israel	53,456	19,344	41,338	13,133	9,594	11,241	7,500	36,283	18,910		
Saudi Arabia						2,649					
India	3,846	19,420					14,724	6,592	4,463	3,800	
Pakistan	27,411	22,240		1,289	6,341		7,875	13,571	16,224		15,180
Ceylon								5,155			
Siam	5,938	2,823						2,120			
British Malaya											
Indonesia	69,597	8,278		5,620	104,410	21,624		61,655		6,285	
Philippine Republic				3,836		6,748		5,966	2,712		
Japan			2,425							220,000	
Australia	40,149	114,685	208,560					79,288	138,884		17,485
New Zealand											
French Pacific Islands								1,464			
French Morocco									1,445		
Tangier											
Ethiopia											
Union of South Africa	3,877	1,601	7,862	3,063		3,625		7,065		207,853	
Countries under \$1,000	2,973	5,514		9,873		8,341	1,484	3,160	3,035	325	
Haiti											
Angola											
Germany		15,508	269,449	4,189	1,246				8,754	58,215	15,298
Iran											
Southern Rhodesia											
Belgian Congo	9,376										
Burma	18,418										
Yugoslavia		11,180	10,665								
Taiwan		4,563		7,330		9,077					
Trinidad				5,452							
Finland					8,262	2,950					
Bermuda							1,565				
Bahrein									1,400		
Egypt									1,629		
Bahamas											
Tunisia											
Gold Coast											
Nigeria											
Mozambique											
Afghan											
Sudan											
French West Africa											
British East Africa											
Total	2,157,658	5,533,881	5,117,529	429,840	481,877	1,843,401	962,939	875,276	2,225,581	3,293,280	2,241,483

Countries	Grinding machines			Lapping and honing machine except gear	Thread-grinding machine	Metal-grinding machine	Boring-drilling-milling-machine	Broaching machine	Gear-honing and lapping machine, gear finishing	Metal-working machine, power-driven	Forging machinery and parts	Total
	Tool and cutter, universal tool, etc.	External cylindrical	Gear-tooth									
Canada	\$427,259	\$295,364	\$27,274	\$252,560	\$19,010	\$472,497	\$359,417	\$479,504	\$237,723	\$670,021	\$2,191,534	\$16,170,170
Mexico	45,763	70,019		6,092		70,410	8,750		1,250	90,264	172,557	1,924,436
Guatemala						1,880				1,057	32,378	62,906
Salvador	4,034					1,639				2,294	3,182	36,984
Honduras	1,122					1,162				10,302	5,404	28,736
Nicaragua		1,317				2,193						11,903
Costa Rica						1,486					3,994	23,276
Panama						1,207				4,658		20,928
Canal Zone	2,783										1,306	51,122
Cuba	10,755					12,118				21,860	12,900	240,352
Jamaica						2,937				1,315		37,950
Dominican Republic		13,335				4,972		2,724		5,478	18,753	102,064
North Antilles						1,920				4,988		26,151
Columbia	14,383					30,633				36,022	20,628	583,611
Venezuela	12,402	16,495				44,701				29,818	27,605	300,935
British Guiana												9,750
Surinam											1,469	10,548
Ecuador	2,740					1,402				3,187	1,646	59,332
Peru	13,755					8,600				8,108	17,853	178,011
Bolivia	4,818					4,043				5,855	8,132	53,992
Chile	9,897	19,440				17,087		1,624		11,429	29,770	194,706
Brazil	118,409	201,606		10,847		167,797	155,730	16,911	8,549	139,438	334,575	2,998,730
Paraguay												5,963
Uruguay	6,243	4,950		10,966		19,524				12,439		181,503
Argentina	46,468			27,823		57,346		18,925	6,834	28,678	12,296	473,589
Sweden	52,851	5,798		2,129		21,331		94,031	66,802	19,506	150,062	1,158,516
Norway	6,915			1,038		5,690				8,674	129,464	296,929
Denmark				1,561		1,748				2,915	8,766	118,918
United Kingdom	87,792	227,490	42,784	593,790		169,928	863,957	59,907	266,438	173,778	424,673	17,902,290
Ireland	1,612					1,210				1,250	1,414	9,584
Netherlands	8,081	3,328		12,500		6,502	23,878	9,795		79,265	4,342	672,013
Belgium	22,988	13,035		8,862		28,229		86,577		47,434	106,529	765,565
France	166,292	828,500		471,877	122,096	103,173		343,886	241,599	83,271	727,552	12,078,237
Austria	4,426	7,957				35,222			15,590	11,360	65,886	435,306
Switzerland	36,618	9,968		6,135		9,357	199,312			31,863	64,984	683,098
Spain	4,800			1,095		1,244			15,585			219,317
Portugal	1,240					1,059				4,472		80,001
Malta												24,122
Italy	92,187	86,322	46,413	409,955	41,199	36,913	224,090	96,661	184,347	100,894	1,334,011	9,015,973
Trieste		14,454		5,104			53,771					336,711

Greece	12, 673					18, 667				5, 434		98, 406
Turkey	8, 411					18, 876	12, 583			6, 057	7, 864	151, 089
Syria						2, 160				10, 738		18, 036
Lebanon						3, 358						10, 589
Israel	30, 998			4, 872		15, 788			9, 428	41, 108	231, 535	897, 454
Saudi Arabia	1, 912			1, 653		5, 549				2, 481	6, 769	100, 818
India	12, 814	4, 887		1, 535		13, 688				19, 168	30, 874	191, 310
Pakistan	6, 521	8, 972				2, 652				3, 101	3, 809	146, 751
Ceylon												11, 536
Siam						5, 009				2, 793		39, 780
British Malaya									8, 188	1, 010	4, 962	28, 375
Indonesia	13, 119		5, 801			53, 441				24, 380	15, 336	560, 877
Philippine Republic	15, 510					7, 891				7, 580	28, 548	132, 352
Japan	6, 730			17, 940				28, 420	171, 397	16, 240	10, 190	497, 085
Australia	27, 505	5, 055	16, 176	2, 260	25, 031	11, 576			53, 429	18, 148	311, 909	1, 431, 203
New Zealand	1, 170									5, 340	45, 112	137, 673
French Pacific Islands										2, 483		29, 987
Tangier										2, 020		19, 944
Ethiopia												2, 190
Union of South Africa	22, 157					22, 648				44, 820	53, 887	471, 033
Countries under \$1,000	4, 886	3, 526		3, 674		8, 959			690	4, 026	5, 109	91, 083
Haiti										1, 135		2, 960
Angola	2, 321											2, 321
Germany	15, 652	1, 767				1, 669				1, 600		7, 691
Iran				72, 211		26, 019			115, 607	9, 600		920, 682
Southern Rhodesia												6, 655
Belgian Congo	10, 141	1, 644				2, 404				2, 810		9, 963
Burma						8, 683				18, 389	17, 212	73, 054
Yugoslavia	37, 782											18, 418
Taiwan		69, 231				1, 347				2, 072	22, 250	59, 627
Trinidad												115, 870
Finland	1, 731								20, 146			5, 452
Bermuda												33, 089
Bahrein												1, 665
Egypt	15, 185									9, 253	2, 250	1, 400
Bahamas	1, 655											28, 317
Tunisia	5, 029											1, 655
Gold Coast	13, 708											5, 029
Nigeria	2, 566											13, 708
Mozambique	1, 989											2, 566
Afghan						2, 464						1, 989
Sudan										1, 903		2, 464
French West Africa										1, 081		1, 903
British East Africa										2, 034		1, 081
Total	1, 478, 798	1, 914, 460	138, 448	1, 926, 479	207, 336	1, 524, 786	2, 431, 868	1, 238, 965	1, 423, 602	1, 918, 697	6, 711, 281	73, 974, 092

PATIENT'S NAME		DATE		TIME		PLACE		REMARKS	